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GENDER DIFFERENCES IN RISK FACTORS AND MECHANISMS FOR  
ADOLESCENT OFFENDING

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A Dissertation

Presented to

The Faculty of Arts and Humanities

University of Denver

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

---

by

Emma Venell Espel

June 2015

Advisor: Julia Dmitrieva, Ph.D.

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Degree Date: June 2015

### **Abstract**

From 1985 to 2009, the juvenile justice system processed 86% more offending cases for females, with only a 17% rise in male cases (Puzzanchera et al., 2012), highlighting the urgent need for understanding of gender differences in etiological factors of offending. Specifically, there is an essential need to understand mechanisms of the relationship between risk factors and offending behavior. The current work combines two studies with a gender-sensitive approach and an aim to investigate gender differences in a subset of modifiable mechanisms, such as anxiety and impulse control, which link interpersonal risk and offending. The first study tests gender differences in the role of internalizing problems in mediating the link from interpersonal violence exposure to offending. The second study tests gender differences in the role of impulse control and substance use as mediators of the association between interpersonal risk factors and offending behavior. This research utilizes a cross-sectional design with 219 adjudicated girls and 1,094 adjudicated boys to compare the gender-related effects of several theoretically relevant interpersonal risk factors (exposure to community victimization, family violence, and low parental knowledge) and mediators (anxiety symptoms, depressive symptoms, impulse control, and substance use) on offending for adjudicated youth. The proposed models were tested with Structural Equation Modeling using propensity scores to control for non-random gender assignment. Study 1's models with

anxiety and depressive symptoms as the mediators had excellent fit, (anxiety symptoms  $\chi^2(4) = 23.68$ ,  $SE < .001$ ; RMSEA = .06; CFI = .98; depressive symptoms  $\chi^2(4) = 22.51$ ,  $p < .001$ ; RMSEA = .06; CFI = .98). Study 2's model also had excellent fit ( $\chi^2(8) = 93.04$ ,  $p < .001$ ; RMSEA = .09; CFI = .96). Several hypothesized mediation pathways and interaction effects were supported across both models. Taken together, the results from both studies suggest interpersonal relationships are consequential for female offending behavior, with indirect pathways via anxiety, impulse control, and substance use. On the other hand, male adolescents' exposure to community, victimization contributes directly to high levels of offending relative to female levels of offending. These studies, in concert, contribute a direct examination of risk factors for female and male adolescent offending behavior and have implications for the research, rehabilitation, and treatment of adjudicated youth. Understanding of modifiable mechanisms, such as internalizing problems and adolescent behavior, has the potential to inform the selection of constructs in future research as well as decisions about mechanisms to target in programs designed to prevent recidivism among adjudicated youth.

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## **Chapter One: General Introduction**

The proportion of incarcerated adolescent females has risen over the last 30 years (Snyder & Sickmund, 2006), with increasing arrests for violent crimes, burglary, larceny-theft, motor-vehicle theft, and drug-related offenses (Puzzanchera, Adams, & Hockenberry, 2012). From 1985 to 2009, the juvenile justice system processed 86% more offending cases for females, with only a 17% rise in male cases (Puzzanchera et al., 2012). Although the trend of increasing female juvenile offending is alarming, there is also evidence that it is more indicative of the recent changes in adjudication practices (Zahn et al., 2008). In fact, females continue to exhibit less offending behavior than males, as they may be protected from it by social and psychological factors.

In spite of the apparent gender differences in adolescent offending behavior, there are few theories that explain, and fewer studies that evaluate, gender differences in risk factors for and mechanisms of male and female adolescent offending. For example, the General Theory of Crime (Gottfredson & Hirschi, 1990) explains all criminality as a function of self-control, and notes that self-control is influenced by a variety of factors, including parental supervision. Similarly, the Life Course Perspective as outlined by Sampson and Laub (2005) suggests that developmental turning points, such as family risk exposure, in conjunction with the development of self-control, contribute to development of offending behavior. Trauma-informed perspectives highlight the direct link between trauma and posttraumatic stress symptoms among offending youth populations (Kerig &

Becker, 2010). The Triple Threat theory (Owen & Bloom, 1995) recognizes females' propensity to experience interpersonal trauma in conjunction with economic and social marginalization contribute to their offending behavior. This set of perspectives (GTC, Life-Course, Trauma-informed, Triple Threat) is not exhaustive, yet it provides an example of the common interest in using interpersonal risk to explain offending behavior and a common critical failure to explain gender differences in the association between risk and offending behavior. While interpersonal risk is clearly not the sole contributor to offending, it offers the opportunity to examine gender-differentiated nuances in the effect of a common risk factor and offending behavior.

Both male and female juvenile offenders experience more than their fair share of interpersonal violence. With an aim to examine gender differences in the role of internalizing problems in mediating the link between interpersonal risk factors and offending, in Study 1, I propose that interpersonal risk factors play a more direct role in male than female offending. Specifically, I propose that interpersonal risk is directly associated with offending among adolescent males, but only indirectly related to offending among females (with internalizing problems mediating the path from interpersonal risk to offending among females). Next, with an aim to examine gender differences in psychological and behavioral traits in relation to juvenile offending, in Study 2, I propose to examine gender differences in the association between exposure to interpersonal risk and offending as explained by impulse control (a trait that has been well-studied and linked to offending among males). Specifically, I examine the pathway from interpersonal risk factors to offending via impulse control and substance use. The

proposed model accounts for gender differences in level of exposure to risk and gender differences in associations among interpersonal risk factors, mediators, and offending.

### **Exposure to Interpersonal Violence and Internalizing**

Findings are mixed regarding gender differences in the level of exposure to interpersonal violence as a risk factor for offending. Generally, it appears that non-adjudicated females and males in the community are exposed to similar levels of community and family violence (Moffitt, 2001). If the level of exposure to community violence is similar for males and females, one would expect the ratio of males and females in the justice system to also be similar, given exposure to interpersonal violence is a prominent risk factor for adolescent male and female offending (Moffitt, 2001). Furthermore, adjudicated female adolescent offenders appear to experience more interpersonal risk, such as family violence, than adjudicated male adolescent offenders (Kerig, Ward, Vanderzee, & Moeddel, 2009), which suggests a higher threshold for interpersonal victimization and offending among females. Thus, this pattern of findings suggests that females may have a higher threshold for offending in response to victimization and victimization may predict offending more strongly for males than females. This assertion, however, does not indicate that interpersonal victimization has lower consequences for females' well-being. In contrast, research and theory on gender socialization during childhood and adolescence (Paquett & Underwood, 1999) would suggest that interpersonal victimization matters more, not less, for adolescent females than males. While males exhibit high levels of direct aggression (Card, Stucky, Sawalani, & Little, 2008), female adolescents who experience interpersonal violence appear to

manifest distress via internalizing problems. For example, female adolescents are at twice the risk for developing depression (Nolen-Hoeksma & Girgus, 1994) and are more likely to experience co-morbid anxiety and offending problems (Wiesner & Kim, 2006), relative to their male counterparts. Interpersonal risk likely contributes to this association; in fact, interpersonal violence is more strongly correlated with internalizing among females than males (Kerig et al., 2009). Furthermore, internalizing symptoms have historically been more socially accepted among females than males. Thus, it is reasonable to expect that the association between exposure to interpersonal violence and offending is mediated by internalizing for females, but not for males.

### **Exposure to Interpersonal Risk and Impulse Control**

Poor impulse control is another major risk factor for adolescent delinquent behavior (White, Jarret, & Ollendick, 2013). However, the importance of impulse control has mainly been explored in all-male samples of offenders. The only study (of which I am aware) to compare the importance of impulse control in male and female adolescent offending found evidence supporting a stronger link for males than females in predicting property, violent, drug-related, and other delinquent offenses (LaGrange & Silverman, 1999). Impulse control may help explain gender differences in adolescent offending in two ways. First, females tend to have higher levels of self-control than males do (Cross, Lee, & Campbell, 2011). This gender difference in self-control can be explained with both gender differences in socialization of self-control (Nagin & Paternoster, 1994; Wong, 2013) and gender differences in brain chemistry and its behavioral correlates (Soloff, Kelly, Strotmeyer, Malone, & Mann, 2003). Second, the effect of parental

monitoring on impulse control may differ for males and females. That is, lower parental knowledge may be associated more strongly with poor impulse control, substance use, and consequent female offending (vs. male offending). Similarly, family hostility and community violence may be associated with impulse control and downstream behavior consequences, with different pathways for males and females. However, this relationship has never been tested among adjudicated male and female adolescents.

### **The Current Study**

The current two studies aim at investigating gender differences in the mechanisms that link interpersonal risk and offending. The first study tests gender differences in the role of internalizing problems in mediating the link from interpersonal violence to offending. The second study tests gender differences in the role of impulse control and substance use as mediators of the association between interpersonal risk factors, and offending behavior.

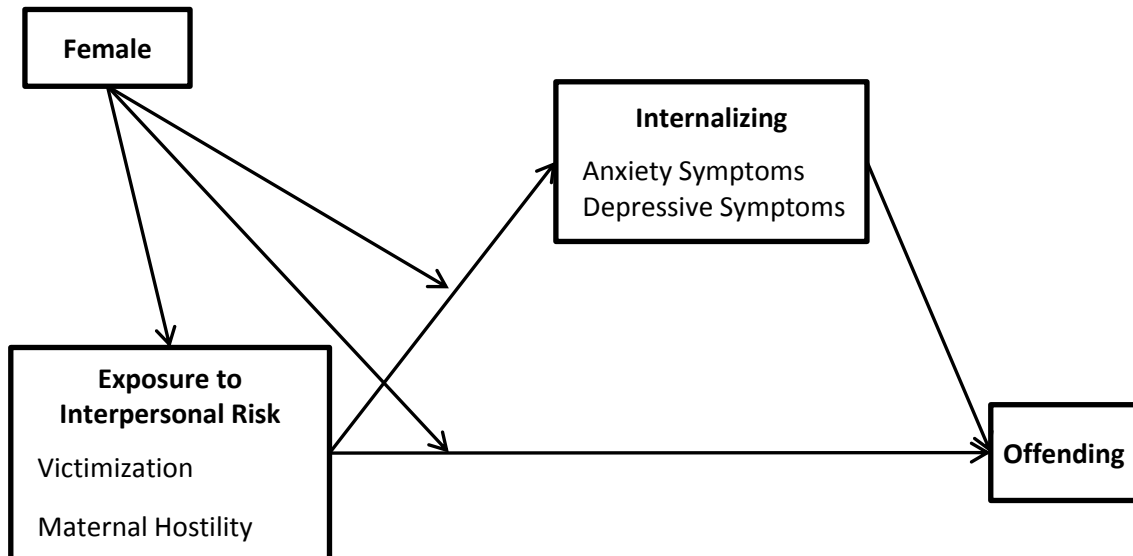
This research utilizes a cross-sectional design with  $n = 219$  adjudicated girls and  $n = 1,094$  adjudicated boys to compare the gender-related effects of several theoretically relevant interpersonal risk factors (exposure to community victimization, family violence, and low parental knowledge) and mediators (internalizing, impulse control, and substance use) on offending for adjudicated youth. The proposed models were tested with Structural Equation Modeling using propensity scores to control for non-random gender assignment.



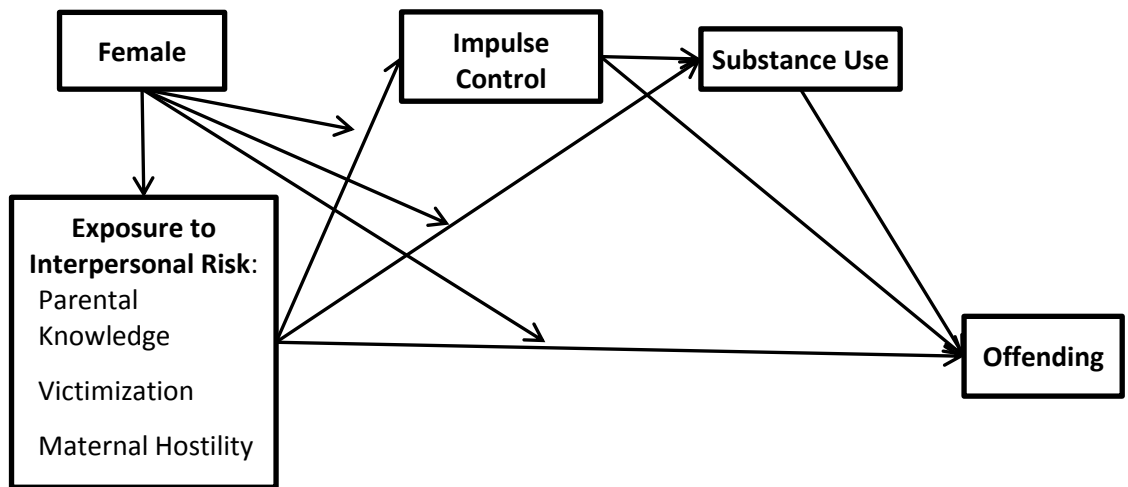
## Hypotheses

**Study 1.** As seen in *Figure i* below, the pathways from maternal hostility and exposure to community victimization to offending are each partially mediated by internalizing problems, accounting for gender differences in levels of social risk. The pathways from exposure to interpersonal violence (community victimization and maternal hostility) to offending as mediated by internalizing are stronger for females than males, and the direct effect of social risk factors on offending is stronger for males.

**Study 2.** As seen in *Figure ii*, I expect that impulse control and substance use mediate the relationship between interpersonal risk factors and offending. Given the lack of literature on the gender differences in the effects of impulse control on offending, this study will explore gender differences in this mediational pathway.



*Figure i.* Proposed theoretical model for Study 1



*Figure ii.* Proposed theoretical model for Study 2.

## **Chapter Two: Study 1 Abstract**

Juvenile offending is an important social problem. Although recent trends indicate overall decreases in adolescent offending between its 1997 peak and 2009, the justice system processed 30% more cases in 2009 than it did in 1985 (Puzzanchera, Adams, & Hockenberry, 2012). Despite the apparent significance of female juvenile offending and evidence of gender differences in the rates of juvenile offending, most research on the etiology of offending is based on male samples. Few studies have evaluated gender differences in risk factors and the mechanisms associated with adolescent offending. The purpose of the current study is to examine gender differences in the effects of well-known interpersonal risk factors on offending behavior in a sample of adjudicated youth, while also testing for the role of internalizing behavior in mediating the paths from interpersonal risk to offending. The hypothesis that internalizing would mediate the relationship between interpersonal risk and offending for females, whereas males would experience a direct relationship between interpersonal risk factors and offending, was partially supported. This research utilizes a cross-sectional design with  $n = 219$  adjudicated girls and  $n = 1,094$  adjudicated boys to compare the gender-related effects of several theoretically relevant interpersonal risk factors (exposure to community victimization, family violence) and mediators (anxiety symptoms, depressive symptoms,) on offending for adjudicated youth. The proposed models were tested with Structural Equation Modeling using propensity scores to control for non-random gender

assignment. The tested models fit the data well, ( $\chi^2(8) = 93.04, p < .001$ ; RMSEA = .09; CFI = .96) for anxiety symptoms and  $\chi^2(6) = 63.18, p < .001$ ; RMSEA = .09; CFI = .97 for depressive symptoms. In conclusion, gender differences in the etiology of offending behavior help explain why females are adjudicated less frequently than males. Furthermore, the identification of these gender differences can inform the design of effective prevention and rehabilitation programs for the rising proportion of incarcerated adolescent females. Anxiety in particular partially explains the risk for association between exposure to maternal hostility and offending among females. This finding is important as it a) highlights the importance of family relationships for female offenders and b) identifies anxiety an important factor to target with appropriate interventions. This study sets the stage for future research, policy, and practice with adolescent offenders.

### **Chapter Three: Study 1 Introduction**

Juvenile offending is an important social problem. Despite recent trends that indicate overall decreases in adolescent offending between its 1997 peak and 2009, the justice system processed 30% more cases in 2009 than it did in 1985 (Puzzanchera, Adams, & Hockenberry, 2012). Youth offenders that face incarceration risk disruption of normal developmental processes that occur during adolescence (e.g., development of mature judgment/ impulse control; Steinberg, Chung, & Little, 2004). Justice involvement and incarceration often limit youths' educational and future vocational opportunities. Furthermore, juvenile offending has larger societal implications, such as psychological and financial costs for the victims and societal burdens of victim rehabilitation and youth incarceration. Finally, the nation suffers other losses associated with incarcerated youths' potential failure to develop into educated, productive, and thriving adults (Steinberg et al., 2004).

Both male and female adolescent offenders were most often adjudicated for person, drug, and public order crimes in 2009, reflecting an increase from 1985 rates (Puzzanchera et al., 2012). Compared to males, females continue to exhibit less offending behavior overall, are adjudicated less frequently, and are less likely to engage in violent offending (Schwartz & Steffensmeier, 2007). Though they are less likely to commit violent offenses, more recent studies highlight an increase in the proportion of crimes committed by female youth that are classified as violent (Knoll & Sickmund, 2010).

Furthermore, in recent years the juvenile justice system processed 86% more offending cases for females, with only a 17% rise in male cases (Puzzanchera et al., 2012). Despite the apparent significance of the female juvenile offending and evidence of gender differences in the rates of female juvenile offending, most research on the etiology of offending is based on male samples. Few studies have evaluated gender differences in the risk factors and mechanisms associated with adolescent offending. The purpose of the current study is to examine gender differences in the effects of well-known interpersonal risk factors on offending behavior in a sample of adjudicated youth, while also testing for the role of internalizing behavior in mediating the paths from interpersonal risk to offending.

The increase in *female* juvenile offending is all the more troubling given that female offenders may suffer from a wider range of psychological problems than their male counterparts. Adjudicated adolescent females face higher rates of comorbid psychiatric disorders (e.g., anxiety, depression) than males (Aalsma & Lapsley, 2001; Wasserman, McReynolds, Ko, Katz, & Carpenter, 2005; Wiesner & Kim, 2006). Many incarcerated adolescent females have had children of their own or have children soon after their release into the community. In 2007, approximately one quarter of adolescent detainment facilities had at least one pregnant teen (Gallagher, Dobrin, & Douds, 2007). Adjudicated mothers often face single parenthood after their release (Bloom, 1996), in contrast to their male counterparts (Glaze & Maruschak, 2010). This risk is compounded by the added risk parental incarceration places on young children of adjudicated adolescents (Geller, Garfinkel, Cooper, & Mincy, 2009). Adjudicated adolescents'

symptomatology is not only relevant for their own adjustment but also potentially influence health outcomes for their children.

Given these gender differences in risk and mechanisms of offending, it is possible that offending problems are part of a different etiologic milieu for girls, as compared to boys. Thus additional and different treatments for young female offenders may be warranted in order to thwart detrimental effects of offending on youth development and society's potential. Furthermore, these young women's mental and behavioral health has consequences for both the immediate and long-term health of not only youth in the juvenile justice system, but of the nation.

The trend of increasing female juvenile offending behavior is alarming and important. However, there is also evidence that it is indicative of the recent changes in adjudication practices and perceptions, rather than an increase in offending behavior among females (Zahn et al., 2008). Until recently, females exhibiting antisocial behavior such as running away, fighting, and theft, were often psychiatrically evaluated for displaying what was considered to be abnormal, masculine tendencies, though this behavior was not typically seen as threatening. They were consequently institutionalized for their behavior which was viewed as immoral or masculine (but not necessarily as dangerous). Even more so, they were rarely incarcerated (Schwartz & Steffensmeier, 2007). Females are now broadly recognized by American society to exhibit offending behavior, though they may always have exhibited characteristics such as aggression. Thus, it is important to explore risk factors for offending behavior beyond that of adjudication practices or causes of changes in female behavior.

## **Risk Factors for Adolescent Offending**

Theoretical perspectives reflect changes in societal thinking about female crime such that they focus on male offending behavior, given the long history of high rates of male offending. These theories largely do not account for gender differences in offending behavior, but they do share important common risk factors. For example, the General Theory of Crime (GTC, Gottfredson & Hirschi, 1990) explains criminality as a function of self-control, and notes that self-control is influenced by a variety of factors, including parental supervision. Their brief and unsatisfactory explanation of gender differences in crime suggests males commit more crimes than females because they have less self-control, as a result of lower parental supervision. Yet, the authors also concede other factors beyond the scope of the theory contribute to gender differences in crime.

Similarly, the Life Course Perspective as outlined by Sampson and Laub (2005) suggests that developmental turning points, such as trauma in the family, in conjunction with the development of self-control, contribute to development of offending behavior. For example, they suggest children and adolescents may experience parental criminality, but that these youth also have agency in the decision to offend. Unfortunately, their claims are based primarily on male samples.

Fortunately, trauma-informed perspectives (Kerig & Becker, 2010) and theories focusing on unique female experiences (e.g., Triple Threat, Owen & Bloom, 1995) have begun to take a gender-sensitive approach. Broadly, trauma-informed theories highlight the direct link between trauma and posttraumatic stress symptoms among offending youth populations. They suggest that cognitive, social, and emotional processing affected



by trauma contributes to offending behavior among youth. These perspectives begin to suggest that gender differential *responses* to interpersonal risk may help explain gender differences in crime. Similarly, the Triple Threat theory (Owen & Bloom, 1995) recognizes females' propensity to experience interpersonal trauma in conjunction with economic and social marginalization contribute to their offending behavior. These theorists also recognize a gap and call for more studies directly examining gender differences in risk factors and mechanisms of offending for adolescent youth.

This set of perspectives (GTC, Life-Course, Trauma-informed, Triple Threat) is not exhaustive, yet it provides an example of the common interest in using interpersonal risk to explain offending behavior, and the common critical failure to explain gender differences in the association between risk and offending behavior. Similarly, few empirical studies have used their models to compare the strength of association between interpersonal risk and offending behavior for young males and females. Even fewer have appreciated complexities of the mechanisms that may account for the link between interpersonal risk exposure and offending behavior. While interpersonal risk is clearly not the sole contributor to offending, it offers the opportunity to examine gender-differentiated nuances in the effect of a common risk factor and offending behavior.

In line with these theoretical arguments, empirical evidence suggests female and male offenders share many risk factors for delinquency, such as economic hardship and racial marginalization (Steffensmeier & Haynie, 2000), as well as exposure to community victimization and family violence (Johansson & Kempf-Leonard, 2009). In fact, the majority of adjudicated youth (90%) report exposure to trauma (interpersonal or

otherwise), with multiple co-morbid mental health problems (Dierkhising, Ko, Woods-Jaeger, Briggs, Lee, & Pynoos, 2013). However, it is unclear whether the amount of exposure to interpersonal risk and the impact of community victimization or family hostility on offending are different for males and females. A gender-sensitive approach to understanding adjudicated youth would suggest that male and female adolescent offenders experience (a) different levels of exposure to interpersonal risk and (b) a different threshold for interpersonal risk as a predictor of offending behavior, resulting from gender-specific etiological pathways from interpersonal risk to offending.

**Level of Exposure to Interpersonal Risk.** Gender-specific empirical examples rooted in feminist and life-course perspectives support comprehensive models for women because they capture complexities specific to female offenders while not discounting male experiences (e.g., Daigle, Cullen, & Wright, 2007; Johansson & Kempf-Leonard, 2009; Makarios, 2007; Simpson, Yahner, & Dugan, 2008). These studies suggest adolescent female offenders are exposed to more risk factors for poor behavioral and mental health outcomes (i.e., minority status, low socio-economic status [SES], and history of interpersonal violence exposure) than non-offending females (Owen & Bloom, 1995) and offending males (Messina & Grella, 2006; Ariga et al., 2008).

In this study, exposure to interpersonal risk is defined as exposure to hostility or violence in relationships with others in the community at large, peer groups, romantic relationships, and/or the family. This definition incorporates victimization within the community (i.e., being a victim of a neighborhood crime or school bullying), as well as

hostility experienced within family relationships. Community victimization and family hostility are thus considered to be related but distinct constructs.

Empirical findings are mixed regarding gender differences in the level of exposure to interpersonal risk. Generally, it appears that females and males *in the community* are exposed to similar levels of violence (Moffitt, 2001). Yet, proponents of gender-specific offending pathways note that *adjudicated* females face more interpersonal risk than adjudicated males (Ariga et al., 2008; Messina & Grella, 2006) and non-offending females (Owen & Bloom, 1995). For example, Cauffman, Feldman, Waterman, and Steiner (1998) found that female juvenile offenders reported direct risk (e.g., violent attacks) more than males, whereas males reported witnessing violence more than females. Furthermore, a disproportionate number of incarcerated female adolescents have been involved with the child welfare system, indicating deeper histories of sexual and physical violence in the home (Gardell, 2010; Kerig, Ward, Vanderzee, & Moeddel, 2009). Thus, despite similar levels of exposure in the general population when comparing genders, adjudicated female adolescent offenders appear to experience more direct interpersonal violence, and family violence in particular, than adjudicated male adolescent offenders.

**Gender Differences in Interpersonal Risk Threshold.** The disproportionality of females and males in the justice system relative to their level of interpersonal risk exposure suggests a higher threshold for interpersonal risk as a predictor of offending among females. That is, females appear to experience the same, if not more, exposure to interpersonal risk as males do, yet they are less prevalent in the juvenile justice system.

This assertion, however, does not indicate that interpersonal risk is less consequential for females' behavior. Research and theory on gender socialization during childhood and adolescence suggests interpersonal risk actually matters more, not less, for females than males (Paquett & Underwood, 1999). Consequently, gender-specific theories emphasize that females may be at increased risk for relationship-driven offending precipitated by interpersonal risk. I propose that girls' higher tendency to internalize is associated with their stronger direct effect of interpersonal risk on internalizing and only indirect effects on offending problems.

In support of this position, females tend to show more interest in relationship quality than males do (Roy, Benenson, & Lilly, 2010) and thus, may be more susceptible to antisocial influences or instability in close relationships. It has been argued that females may lose self-focus by changing themselves to meet relationship expectations (Covington & Surrey, 1997). Females may offend in reaction to anxiety induced in a hostile mother-daughter relationship. In fact, females report greater maternal hostility than males do (Henggeler, Edwards, & Borduin, 1987).

Healthy parent-adolescent relationships are key associates for healthy adolescent development, particularly for females. Parents are meant to provide protection, safety, and stability for their children. Yet, often, adolescent offenders experience hostility and instability in the parent-adolescent relationship. The combination of girls' higher exposure to family hostility and girls' greater focus on relationships has prompted some researchers to propose that there is a stronger link between interpersonal risk exposure and offending among girls than boys. For example, Wong et al. (2013) reported that the

parent-adolescent relationship predicts offending for females but not males. However, females' stronger link between interpersonal violence and offending does not explain why females offend less, and not more, than males. While females' relationship orientation partially explains the association between interpersonal risk and offending, at least one question remains.

**If females experience more interpersonal risk, and are more relationship-oriented than males, why do they offend less than males?** This question may be addressed by turning to literature on internalizing symptoms. Females respond to risk by offending indirectly via internalizing, while there is a stronger direct link between interpersonal risk and offending for males. Taken together, it appears that females have a higher risk threshold, because they respond to interpersonal risk via a mechanism other than offending. Indeed, female adolescents who experience interpersonal violence appear to manifest distress via internalizing, and perhaps consequent offending. Interpersonal risk is more strongly correlated with internalizing among females than males (Kerig et al., 2009). Also, rates of comorbidity of incarcerated females are higher than those for incarcerated males (Aalsma & Lapsley, 2001; Wasserman et al., 2005; Wiesner & Kim, 2006). This co-morbidity is particularly pertinent for female adolescents, as female adolescents are at twice the risk for developing depression than males, regardless of interpersonal violence history (Nolen-Hoeksma & Girgus, 1994). This argument is supplemented by theories suggesting internalizing symptoms are more socially accepted among females than males. For example, aspects of female relationships, such as co-rumination, are related to closer peer relationships and greater internalizing (Rose, 2002).

In parallel, males appear to experience a direct link to offending behavior in response to community violence, rather than via internalizing (Calvete, 2011). For male adolescents, aggression tends to be more socially accepted (Salmivalli, Kaukiainen, & Lagerspetz, 2001), and direct aggression during childhood and adolescence is more prevalent among males than females (Card, Stucky, Sawalani, & Little, 2008). Thus, it is reasonable to expect that the association between exposure to interpersonal violence and offending is mediated by internalizing for females, but not for males.

Taking the next step, it is not surprising that internalizing and offending behavior are linked. The co-occurrence of internalizing and offending has been documented repeatedly (Harrington, Fudge, Rutter, Pickles, & Hill, 1991; Puig-Antich, 1982). While internalizing and offending are separate constructs, they share genetic and environmental influences (Cosgrove, Rhee, Gelhorn, Boeldt, Corley, Ehringer, Young, & Hewitt, 2011). In fact, internalizing problems and offending are both rooted in maladaptive emotion regulation and blunted inhibitory response, and this relationship is evidenced even in children ages 3-8 (Eisenberg et al., 2001). For example, a threatening situation may cause one child to act violently in defense (offending), while another may emotionally withdraw from the situation (internalizing).

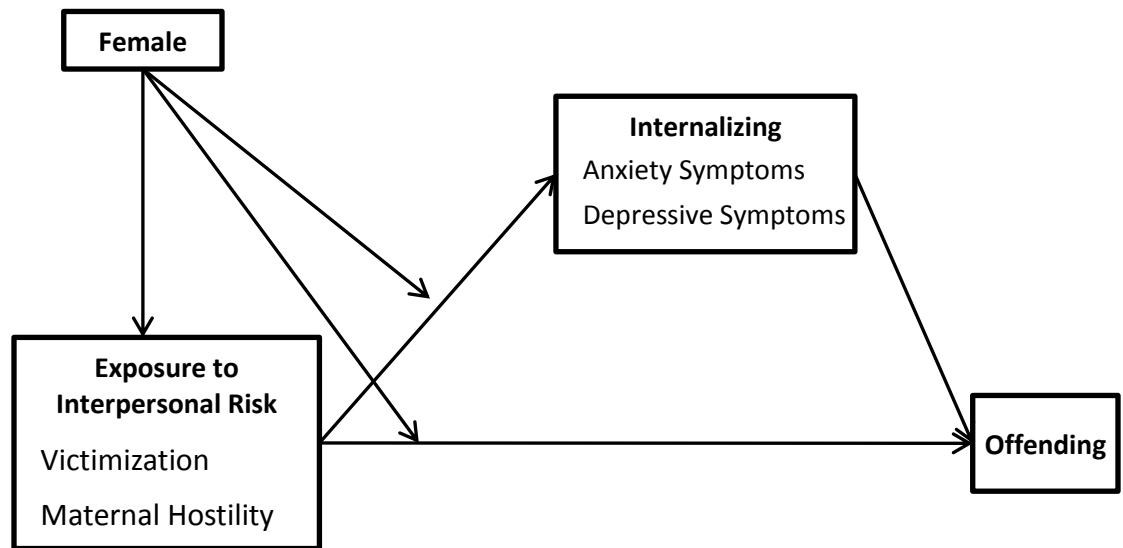
Importantly, mental health problems such as anxiety and depression consistently predict later offending more strongly in females than males (Johansson & Kempf-Leonard, 2009). Offending among female adolescents is highly co-morbid with other psychiatric disorders (Dierkhising et al, 2013; Dixon, Howie, & Starling, 2004; Dixon, Howie, Starling, & Franz, 2005), especially internalizing disorders like anxiety

(Marmorstein, 2007; Berkout, Young, & Gross, 2011) and depression (Offord, Adler, & Boyle, 1986; Marmorstein & Iacono, 2001). Compared to males, females are at an increased risk for co-morbidity between internalizing disorders and conduct disorder (Loeber & Keenan, 1994). The co-occurrence of Post-Traumatic Stress Disorder (PTSD) as a result of interpersonal trauma exposure, anxiety, and offending behavior is not surprising given the underlying physical properties of the symptomology. That is, PTSD is related to emotional and autonomic nervous system dysregulation and hypo or hyper-arousal of the autonomic nervous system in threatening situations (Kerig & Becker, 2005). Similarly, anxiety and depression are characterized by physiological hyper-arousal (Joiner, Thomas, Steer, Beck, Schmidt, & Rudd, 1999). While not all offending behavior includes aggressive acts, aggression is committed in hyper-aroused physiological states, especially in when the body prepares itself to “fight” in the face of a stressor. Furthermore, hostile attribution biases may cause individuals with PTSD to misinterpret typical situations as threatening, and physiological hyper-arousal prepares them to fight, ultimately seeking to protect them from harm. Though these studies have examined isolated associations among predictors and outcomes, taken together, these findings suggest a clear association between (a) interpersonal risk and internalizing, especially among females, (b) internalizing and offending, also among females and (c) support for a stronger pathway from exposure to interpersonal violence to internalizing and perhaps to offending, for females more than males.

## The Current Study

Both male and female juvenile offenders experience more than their fair share of interpersonal risk. The aim of the current study is to identify mechanisms that link interpersonal risk and offending, accounting for potential gender differences in interpersonal risk exposure and internalizing problems. Specifically, I aim to test the extent to which internalizing mediates the relationship between interpersonal risk and offending for adjudicated adolescent males and females. This question is examined with a sample of adjudicated adolescent youth who participated in the study in several locations around the nation. A cross-sectional design is used to simultaneously test the associations among risk factors, mediators, and outcomes for female and male adolescent offenders.

Figure 1.1a demonstrates the hypothesized associations.



*Figure 1.1a.* Proposed theoretical model for Study 1. The pathway from interpersonal risk exposure to offending is explained by internalizing problems; this mediational pathway is moderated by gender.



## Hypotheses

**1. Pathways to offending.** As seen in Figure 1.1a, the pathways from interpersonal violence exposure to offending are partially mediated by internalizing problems; accounting for gender differences in levels of interpersonal risk factors.

### **2. Community victimization.**

**2.1. Main effects.** Females report less community victimization than males.

**2.2. Indirect effects.** When victimized, females express high levels of anxiety and depressive symptoms that are in turn related to offending behavior. In contrast, males are more likely to respond to victimization via a direct path to offending, with a less strongly mediated pathway from *victimization* → *internalizing* → *offending*.

### **3. Maternal hostility.**

**3.1. Main effects.** Based on literature suggesting adjudicated adolescent females come from homes with higher maternal conflict than adjudicated males (Henggeler, Edwards, & Borduin, 1987), I expect females to rate maternal hostility higher than males.

**3.2. Indirect effects.** Considering the salience of relationships for young females (Covington & Surrey, 1997), and congruent with the trends in victimization, females with high maternal hostility have higher anxiety and depressive symptoms and higher associated offending. In contrast, males have a stronger

relationship between maternal hostility and offending, with a less strongly mediated pathway from *maternal hostility* → *internalizing* → *offending*.

## **Chapter Four: Study 1 Method**

### **Participants**

The sample consisted of adolescent juvenile offenders from the Girls in Transition Study (a study of adjudicated adolescent females in Colorado) and the Pathways to Desistance Study (a study of adjudicated adolescent male and female offenders in Arizona and Pennsylvania; Mulvey et al., 2004). Participants were drawn from these two samples for three primary purposes. First, the combination of two samples allowed for the augmentation of the sample size; in particular, it is difficult to recruit a sufficient sample size of female offenders because there are fewer adjudicated female than male adolescents. Second, the addition of the Pathways to Desistance sample provided a large ( $n = 1,094$ ) comparison sample of adjudicated male adolescents. Third, while the two research programs were distinct, their interviewing protocols and measures were similar.

The combined sample consisted of 1,313 adjudicated youth (219 females) – with 47 females drawn from the Colorado sample, 83 girls and 533 boys from the Arizona sample, and 89 girls and 560 boys from the Pennsylvania sample.

**Sample characteristics.** As can be seen in Table 1.1, one third of participants (32%) were incarcerated at the time of the interview. Participants were on average sixteen and a half years of age, but were arrested for the first time on average at age ten and a half.

Compared to females, males were arrested for the first time at a younger age than females ( $M = 10.31$ ,  $SD = 1.74$  for males and  $M = 11.50$ ,  $SD = 2.17$  for females,  $t(272.36) = -.87$ ,  $p < .001$ ).

Participants came from diverse backgrounds, with 40% self-identifying as Black, 22% self-identifying as Hispanic/Mexican-American, and 22% identifying as White for the overall sample (see Table 1.1 for distribution by gender). Most participants came from homes with parents born in the United States (81% of fathers and 90% of mothers were born in the United States). Nearly half of the participants' biological parents had never been married (47%). The majority (61%) of adolescents reported being in a current romantic relationship.

Also as can be seen in Table 1.1, female participants drawn from the Girls in Transition or Pathways to Desistance samples had some significant, albeit not dramatic, differences on demographic characteristics. The girls from Pathways to Desistance were one year younger and were arrested for the first time one year earlier than females in the Girls in Transition study. They also had a higher proportion of youth self-identifying as Black and Hispanic, and their mothers had lower levels of education than females in the Girls in Transition study. Finally, a greater percentage of girls in the Girls in Transition sample was incarcerated relative to the percentage of incarcerated girls in the Pathways to Desistance study.

Table 1.1

*Sample Demographics*

Characteristic	Total	Male	Female	GIT	PD	Sex Differences	Sample Differences
	Mean ( <i>SD</i> )					<i>t</i> ( <i>df</i> )	
Age	16.58 (1.16)	16.56 (1.16)	16.67 (1.18)	17.38 (1.22)	16.47 (1.10)	-1.2 (1310)	4.90 (216)***
Age at First Arrest	10.51 (1.87)	10.31 (1.74)	11.50 (2.17)	12.98 (1.85)	11.08 (2.08)	-7.52 (272.36)***	6.07 (80.99)***
People at Home <sup>a</sup>	3.88 (1.97)	3.91 (1.97)	3.70 (1.98)	3.48 (2.23)	3.75 (1.91)	1.48 (1308)	-.83 (214)
	%					$\chi^2(df)$	
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	<i>n</i> = 48	<i>n</i> = 171 <sup>b</sup>		
Incarcerated	32	31	35	98	18	1.53(1)	106.20 (1) ***
<i>Race/Ethnicity</i>						18.68(3)***	8.70 (3)*
White	22	20	31	44	27	-	-
Black	40	42	34	23	37	-	-
Hispanic/Mexican	33	34	28	21	30	-	-
Other	5	5	7	13	6	-	-

Characteristic	Total	Male	Female	GIT	PD	Sex Differences	Sample Differences
	%					$\chi^2(df)$	
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	<i>n</i> = 47	<i>n</i> = 171 <sup>b</sup>		
<i>Parent Marital Status</i>						2.25(4)	2.54 (4)
Married	15	16	12	9	13	-	-
Separated	10	10	10	9	10	-	-
Divorced	22	22	23	28	22	-	-
Never Married	47	47	48	52	49	-	-
Other	6	6	6	2	7	-	-
<i>Maternal Education</i>						13.39(3)**	10.28 (3)*
Some grade school	12	13	7	4	8	-	-
Some high school	33	33	34	18	39	-	-
HS Diploma/GED	33	34	28	31	27	-	-
Post-Secondary	23	21	31	47	26	-	-
Relationship	61	61	64	56	65	.63(1)	1.38 (1)
Father born in US	81	80	56	86	86	4.09(1)*	.00 (1)
Mother born in US	86	85	89	91	89	2.91(1)†	.22 (1)

GIT = Girls in Transition Sample; PD = Pathways to Desistence Sample

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

<sup>a</sup>Number of people at home in addition to participant; <sup>b</sup>For sample comparisons, only females were used since no males were included in the GIT sample.

Importantly, when the combined female sample was compared to males, there were fewer significant differences. Females and males did not differ on age, number of people living at home with them, the current rate of incarceration, parental marital status, current romantic relationship status, and mother being born in the United States. Males were arrested for the first time one year earlier than females, and more males self-identified as Black (42% for males vs. 34% for females) and Hispanic (34% for males and 28% for females). Females had mothers with slightly higher levels of education and they had fathers who were more likely to be born outside of the United States. These differences among males and females were accounted for by using propensity scores in all data analyses.

## **Procedure**

Eligible adolescents were recruited through local juvenile courts and other local youth correction/probation programs. Participants engaged in an in-person interview with a trained research assistant at either a detention facility or community location (if the participant was not incarcerated), such as the participant's home, a mall, or mutually agreed-upon fast food restaurant. When interviews were conducted at a community location, research assistants made an effort to conduct interviews in places where others were not able to hear responses. The interviews included open-ended and scaled responses and lasted approximately two hours. Participating university IRBs approved all recruitment and assessment procedures for the study.

Across both studies, participant reports were protected by the NIH Certificate of Confidentiality. Interviews were voluntary, and participants could refuse to answer

questions without penalty. Participants in the Girls in Transition study were interviewed once during their first adjudication year (the mean number of months at the facility was 6.01,  $SD = 4.10$  months). Participants in the Pathways to Desistance study were interviewed every 6 months following their initial adjudication. To make samples comparable, whenever possible, 6-month follow-up data was utilized for participants from the Pathways to Desistance study. Demographic information such as parental citizenship and parental education were measured at baseline.

## **Measures**

**Community victimization.** The frequency of victimization incidents was measured using an adapted version of the Exposure to Violence Inventory (ETV; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998). The victimization score reflects the proportion of lifetime violent events youth experienced as victims. The scale included four items in the Girls in Transition study (being chased with intent to hurt, being beaten up or mugged, being attacked with a weapon, and being raped or sexually attacked) and six items in the Pathways to Desistance study (with two additional questions about being shot at or shot). The scale responses were standardized within each sample in order to aid comparability. Higher scores indicate greater victimization.

**Maternal hostility** was assessed with a mean of 12 items adapted from the Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994). Participants were asked how frequently their mothers engaged in a variety of hostile actions, such as throwing things at youth or insulting and swearing at youth, on a scale from 1 (*never*) to 4 (*often*). The scale had good-to-excellent internal consistency,  $\alpha$



= .93 for the Girls in Transition sample and  $\alpha = .80$  for the Pathways to Desistance sample.

**Anxiety symptoms** were measured with the anxiety subscale from the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). The mean of six items assessed the frequency of anxiety symptoms such as feeling nervousness or shakiness inside or feeling fearful, with response categories ranging from 0 (*not at all*) to 4 (*extremely*). The Pathways to Desistance study participants were asked to recall their symptoms in the past week, whereas the Girls in Transition participants reported their experiences in the past two weeks). Thus, the anxiety symptoms scores were standardized within each sample, prior to being combined in the overall analysis. The scale items demonstrated adequate internal consistency,  $\alpha = .81$  for the Girls in Transition sample and  $\alpha = .75$  for the Pathways to Desistance study.

**Depressive symptoms** were measured with the depression subscale from the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). The mean of six items assessed frequency of depressive symptoms such as feeling blue or feeling hopeless about the future, with response categories ranging from 0 (*not at all*) to 4 (*extremely*). The Pathways to Desistance study participants were asked to recall their symptoms in the past week, whereas the Girls in Transition participants reported their experiences in the past two weeks. Thus, the depressive symptoms scores were standardized within each sample, prior to being combined in the overall analysis. The scale items demonstrated adequate internal consistency,  $\alpha = .82$  for the Girls in Transition sample and  $\alpha = .79$  for the Pathways to Desistance study.

**Offending** was assessed with items adapted from the Self-Report of Offending Scale (Huizinga, Esbensen, & Weighar, 1991). Participants reported lifetime engagement in offending behaviors, such as theft, selling drugs, or assault. The number of items varied across the two samples, with Pathways to Desistance interviews assessing engagement in each individual offense (e.g., an item assessing selling marijuana and a separate item assessing selling other illegal drugs) and Girls in Transition interviews assessing engagement in grouped offenses (e.g., selling marijuana or other illegal drugs as a single item). Thus, although the two studies assessed engagement in the same range of illegal behaviors, the Pathways to Desistance study included eleven items and the Girls in Transition study included six items. Participant responses were scored as the proportion of all possible offense types endorsed by the youth. Aside from solving the issue of having a different number of items in the two studies, this proportional variety score is arguably a better measure of juvenile offending. It indicates the degree to which youth engaged in different types of offenses during their lifetime – a measure that is less prone to recall errors than frequency of offending scores (especially for high-frequency offenses such as theft) and represents a preferred method of measuring antisocial behavior in the developmental criminology research (Hindelang, Hirschi & Weis, 1981; Thornberry & Krohn, 2000).

## **Analysis Plan**

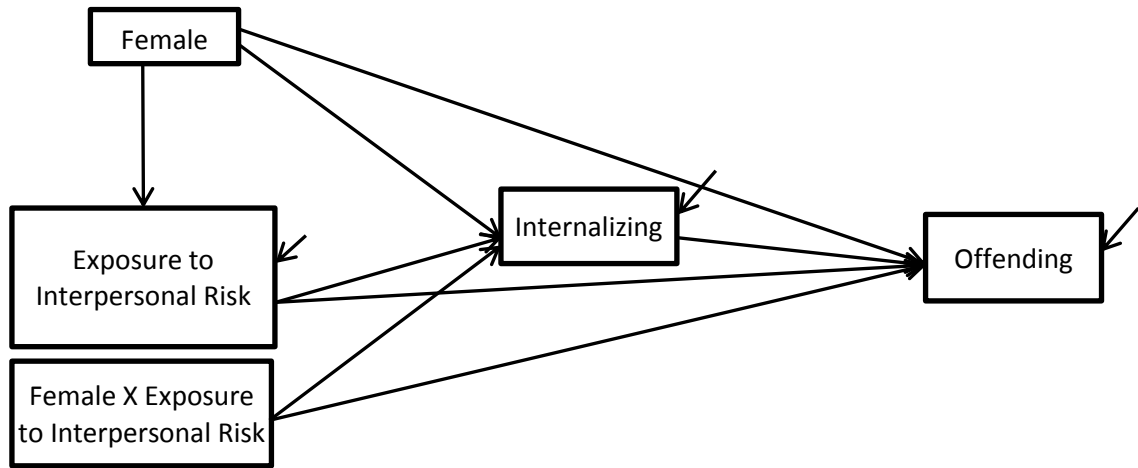
**Descriptive Statistics.** Preliminary analyses focused on examining mean gender differences in the key study variables and exploring gender differences in the zero-order bivariate correlations. Gender differences in predictors, mediators, and outcomes were

tested using t-tests and chi-square tests where appropriate. Gender differences in the bivariate correlations were tested with Fisher r-to-z transformations.

**Propensity scores.** Because males and females have unequal probability of engaging in offending behavior and being adjudicated in the juvenile justice system, all analyses controlled for spurious associations by using propensity score analysis. Propensity scores were created using logistic regression and used as a covariate in subsequent analyses. This method allows for use of a single control variable (i.e., the propensity score) rather than including a multitude of covariates selected for their potential to provide alternative explanations for the association between gender and the key study variables (Hade & Lu, 2011). Propensity scores were created for each individual, based on theoretically-relevant potential confounds: age, age at first arrest, ethnicity, incarceration status at the time of the interview, living situation (number of people in home; parent marital status), maternal citizenship, maternal education, and romantic relationship status.

**Structural equation modeling.** Structural Equation Modeling (SEM) using MPlus Version 6.12 (Múthen & Múthen, 2011) was used to examine the hypothesized models. Figure 1.1a depicts the hypothesized associations. Two separate models tested depressive and anxiety symptoms as mediators of the effects of exposure to violence on offending. Because depression and anxiety are highly correlated (  $r = .66, p < .001$  ), these models were considered separately rather than combined into one model, so independent effects of anxiety and depression would not be concealed due to multicollinearity. Each model controlled for propensity scores and tested moderated

mediation, in accordance with Preacher, Rucker, and Hayes (2007). Figure 1.1b provides a simplified example of SEM paths that were involved in testing moderated mediation pathway for one of the two exposure to interpersonal risk variables. In actuality, the full model tested for the moderated mediations for both victimization and maternal hostility in a single model.



*Figure 1.1b.* Sample path diagram of one moderated mediation model adapted from Model 1 (Preacher, Rucker, and Hayes, 2007) and tested within the full model.

**Model modifications.** After each model was tested, model fit indices were recorded. Model fit was considered good if models yielded a Root Mean Square Error of Approximation (RMSEA) less than .10 and a Comparative Fit Index greater than .90 (McDonald & Ho, 2002). Modification indices were inspected in order to identify additional correlations among predictors that should be included in the model in order to improve the model fit. These correlations reflect shared variance in the predictors and mediators (e.g., victimization is related to maternal hostility). With the addition of these correlations, model fit improved, resulting in two full models that fit the data well (one

model including anxiety symptoms, the other including depressive symptoms as a mediator).

***Model trimming.*** The next step included trimming the model by removing insignificant interactions, in search of parsimony. For both anxiety and depression models, gender did not moderate the paths from exposure to violence (victimization or maternal hostility) to offending, and removing these interactions did not worsen the model fit. Thus, results report coefficients for the two trimmed models.

***Testing/Interpretation of moderated mediations.*** Indirect effects were assessed using bootstrapped estimates of 95% coefficient confidence intervals; this approach accounts for non-parametric sampling distribution of coefficients that is often present for indirect effects (Hayes, 2013). Bootstrapped confidence intervals were generated using 2,000 sample draws.

Gender differences were approached in two ways. First, I tested whether gender had direct and indirect effects on mediator and outcome variables by examining the significance of the direct and indirect paths from gender to other endogenous model variables. Second, I tested whether gender moderated the associations between various model paths. This examination involved (a) inspection of significant product term interaction effects for gender and (b) tests of parameter constraints that examined gender differences among the indirect effects specified by the model. The former tested for gender differences in the direct effects specified by the model (e.g., do females have a stronger than males link from maternal hostility to depressed mood?). The latter tested for

gender differences in the indirect effects (e.g., do females have a stronger than males indirect effect from maternal hostility to depressed mood, and then to offending?)

## Chapter Five: Study 1 Results

First, I tested whether females had higher or lower exposure to interpersonal risk, higher internalizing symptoms, and lower offending. As can be seen in Table 1.2, males reported more general community victimization experiences, but females reported experiencing higher maternal hostility. Not surprisingly, females reported more anxiety and depressive symptoms and lower levels of offending than males.

Table 1.2  
*Sample Descriptives of Predictors and Outcomes*

Predictors	Mean ( <i>SD</i> )			<i>t(df)</i>
	Total	Male	Female	Sex Differences
Victimization	0 (1.0)	.05 (1.00)	-.24 (.93)	4.09 (325.63)***
Maternal Hostility	.003 (.39)	-.03 (.33)	.18 (.54)	-5.45 (241.07)***
Mechanisms				
Anxiety Symptoms	.40 (.58)	.44 (.59)	.73 (.86)	-4.57 (231.64)***
Depressive Symptoms	.49 (.65)	.34 (.49)	.70 (.82)	-5.84 (222.04)***
Offending				
Offending Variety	$\chi^2(df)$			
	.56 (.28)	.58 (.28)	.47 (.26)	5.50 (316.98)***
%				
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	
Property offense	57	59	50	*
Drug Sale	36	38	3	**
Take Something by Force	45	49	26	***

Offending Variety, Continued	%			$\chi^2(df)$
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	
Theft	75	75	72	ns
Weapon Use	27	29	18	**
Physical Fight	96	97	89	***

\**p* < .05   \*\**p* < .01   \*\*\**p* < .001



As can be seen in Table 1.3, greater community victimization was associated with more depressive and anxiety symptoms as well as greater rates of offending for both males and females. Not surprisingly, victimization and maternal hostility were associated with greater offending for both males and females. Also as expected, higher levels of anxiety and depressive symptoms were related to more offending for both genders.

Table 1.3.

*Correlations of Predictors with Mediators and Outcomes*

<i>r</i>	Victimization	M. Hostility <sup>a</sup>	Anxiety <sup>b</sup>	Depression <sup>c</sup>	Offending
Victimization	1	.12***	.15***	.14***	.51***
M.Hostility	.16*	1	.17**	.12**	.17**
Anxiety	.21**	.30***	1	.58***	.13***
Depression	.22**	.29**	.78***	1	.12***
Offending	.49***	.21**	.24**	.19*	1

*Note.* Correlations for males are in the upper right corner of the table; correlations for females are in the lower left corner.

<sup>a</sup>Maternal Hostility <sup>b</sup>Anxiety Symptoms <sup>c</sup>Depressive Symptoms

\*  $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Fisher r-to-z transformations revealed two gender differences in the magnitudes of these correlations. Maternal hostility had a slightly stronger association with anxiety and depressive symptoms for females than males. This difference was significant for the association between maternal hostility and depression ( $z = -2.39, p < .05$ ). The difference was trend level for the association between maternal hostility and anxiety ( $z = 1.85, p = .06$ ). No other gender differences in correlation patterns were evident.

### The Moderated Mediation Model: Anxiety Symptoms

The full model for anxiety (i.e., the model that included sex as a moderator of every model path) had a good fit,  $\chi^2(6) = 68.11$ ,  $SE < .001$ ; RMSEA = .09; CFI = .97. The final trimmed model had excellent fit,  $\chi^2(4) = 23.68$ ,  $SE < .001$ ; RMSEA = .06; CFI = .98. As can be seen in Table 1.4, several of the hypothesized associations were supported. A supplemental figure of the tested model with all unstandardized regression weights is presented in Appendix A.

Table 1.4

*Unstandardized Regression Coefficients for the Moderated Mediation Model of Anxiety*

	<i>b</i>	<i>SE</i>	Critical Ratio
Maternal Hostility regressed on Female	.21***	.03	7.53
Victimization regressed on Female	-.37***	.07	-5.00
Anxiety Symptoms on			
Female	.27***	.05	5.82
Maternal hostility	.20***	.06	3.52
Victimization	.07***	.02	4.45
Female $\times$ Maternal hostility	.21*	.09	2.21
Offending on			
Female	-.09***	.02	-5.10
Maternal hostility	.08***	.02	4.3
Victimization	.13***	.01	20.09
Anxiety Symptoms	.03*	.01	2.29

†  $p < .09$  \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Maternal Hostility.** Females had higher exposure to maternal hostility ( $b = .21$ ,  $p < .001$ ), with downstream behavioral consequences. Higher maternal hostility was associated with higher anxiety symptoms ( $b = .20$ ,  $p < .001$ ) and higher consequent

offending ( $b = .03, p < .05$ ). As hypothesized, maternal hostility mediated the path from gender to anxiety symptoms ( $b = .04, SE = .01, p < .01$ ). Although the *gender*  $\rightarrow$  *maternal hostility*  $\rightarrow$  *anxiety symptoms*  $\rightarrow$  *offending* mediational path was not significant ( $b = .001, ns$ ), the *gender*  $\rightarrow$  *anxiety symptoms*  $\rightarrow$  *offending* mediation that comprises that path was significant and in the expected direction  $b = .01, SE = .004, 95\% CI = .002, .02$ .

Furthermore, there were gender differences in the magnitude of the effect of maternal hostility on anxiety symptoms. As expected, maternal hostility had a stronger effect on anxiety symptoms for females than for male symptoms ( $b = .21, p < .05$ , see Figure 1.2). The indirect path from *maternal hostility*  $\rightarrow$  *anxiety*  $\rightarrow$  *offending* was significant for females ( $b = .012, SE = .01, p < .05$ ), but not for males ( $b = .01, SE = .003, p = .06$ ), although this difference was not significant ( $b = -.01, SE = .01, ns$ ).

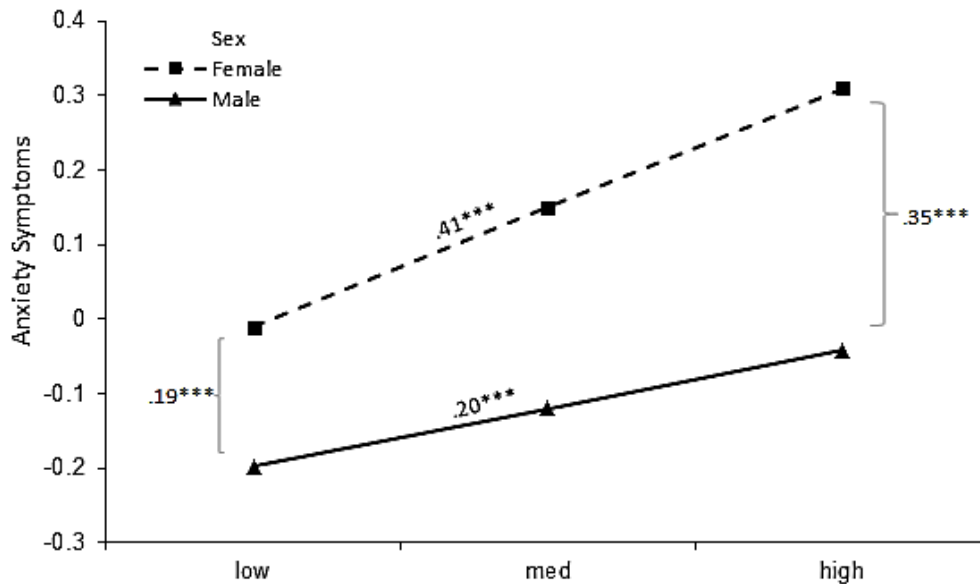


Figure 1.2. Sex moderated the effect of maternal hostility on anxiety symptoms. The effect of maternal hostility on anxiety symptoms was stronger for males than females.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

**Victimization.** Females had lower general exposure to community victimization ( $b = -.38, p < .001$ ). This lower victimization contributed to lowering females anxiety symptoms ( $b = .07, p < .001$ ). As hypothesized, victimization mediated the path from gender to anxiety symptoms. That is, the indirect path from *gender* → *victimization* → *anxiety symptoms* was negative and significant ( $b = -.03, SE=.01, p < .01$ ). The *gender* → *victimization* → *anxiety symptoms* → *offending* mediational path was not significant ( $b = -.001, SE < .00, ns$ ). Finally, in the *gender* → *anxiety symptoms* → *offending* path, females' greater anxiety contributed to their offending behavior ( $b = .001, SE = .004, p < .05$ ) beyond the effects of maternal hostility and victimization.

### The Moderated Mediation Model: Depressive Symptoms

The full model for depressive symptoms (i.e., the model that included sex as a moderator of every path) fit the data well ( $\chi^2(6) = 63.18, p < .001$ ; RMSEA = .09; CFI = .97). The final trimmed model had excellent fit ( $\chi^2(4) = 22.51, p < .001$ ; RMSEA = .06; CFI = .98). As shown in Table 1.5, several hypothesized associations were supported.

Table 1.5.

*Unstandardized Regression Coefficients for the Moderated Mediation Model: Depressive Symptoms*

	<i>b</i>	<i>SE</i>	Critical Ratio
Maternal Hostility regressed on Female	.21***	.03	7.52
Victimization regressed on Female	-.37***	.07	-5.00
Depressive Symptoms on			
Female	.21***	.05	3.90
Maternal hostility	.17*	.07	2.43
Victimization	.08***	.02	4.38
Female × Maternal hostility	.24*	.11	2.18

Offending on			
Female	-.09***	.02	-4.91
Maternal hostility	.09***	.02	4.50
Victimization	.14***	.01	20.15
Depressive Symptoms	.02	.01	1.64

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

**Maternal hostility.** Females had higher exposure to maternal hostility ( $b = .21, p < .001$ ). This finding is consistent with the anxiety symptoms model. In turn, higher maternal hostility was associated with more depressive symptoms ( $b = .16, p < .05$ ). These relationships had downstream internalizing consequences. Maternal hostility mediated the path from gender to depressive symptoms ( $b = .04; SE = .01, p < .05$ ). However, depressive symptoms were not associated with offending. Consequently, the indirect effect from *gender*  $\rightarrow$  *maternal hostility*  $\rightarrow$  *depressive symptoms*  $\rightarrow$  *offending* was not significant ( $b = .001, SE < .00, ns$ ). There were gender differences in the magnitude of the effect of maternal hostility on depressive symptoms. As seen in Figure 1.3, maternal hostility had a stronger effect on depressive symptoms for females than for males ( $b = .24, p < .05$ ).

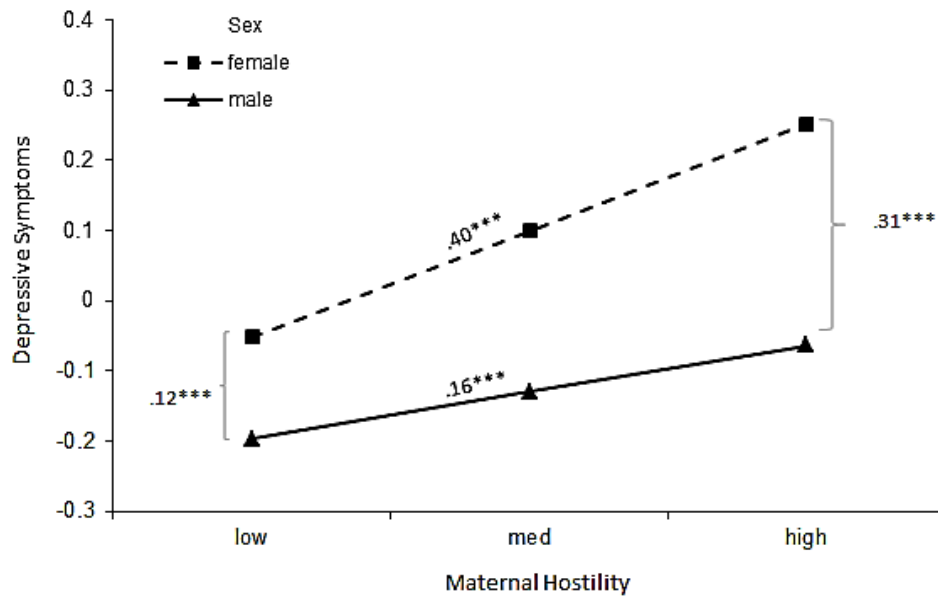


Figure 1.3. Sex moderated the effect of maternal hostility on depressive symptoms. The effect of maternal hostility on depressive symptoms was stronger for males than females. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

**Victimization.** In this model, females also had lower general exposure to victimization ( $b = -.37, p < .001$ ), which contributed to lowering depressive symptoms ( $b = .08, p < .001$ ). This indirect path from *gender*  $\rightarrow$  *victimization*  $\rightarrow$  *depressive symptoms* was negative and significant ( $b = -.03; SE = .01, p < .05$ ). However, the indirect path from *gender*  $\rightarrow$  *victimization*  $\rightarrow$  *depressive symptoms*  $\rightarrow$  *offending* was not significant ( $b = -.03, SE = .001, ns$ ).

Finally, as expected, females reported greater depressive symptoms ( $b = .21, p < .001$ ). However, depressive symptoms did not mediate the association between gender and offending ( $b = .004, SE < .00, ns$ ).

## **Chapter Six: Study 1 Discussion**

Adolescent females are adjudicated less often than adolescent males (Schwartz & Steffensmeier, 2007); yet, previous studies suggest female offenders experience similar, if not more, interpersonal risk than their male counterparts (Messina & Grella, 2006; Ariga et al., 2008). The current study addresses this paradox by documenting gender differences in the etiology of offending behavior among adjudicated youth. Empirical work from gender-sensitive perspectives account for females' propensity to react to traumatic experiences with internalizing problems (Kerig et al., 2009) and males' greater propensity for offending in response to trauma, and explain the apparent gender differences in the apparently higher threshold of female adolescents' interpersonal risk exposure that must be reached in order to contribute to offending (Wong et al., 2013). Studies that support these theories also suggest that females' higher experience of internalizing problems is strongly associated with offending behavior (Sheidow et al., 2008). The present study extends these findings to show partial support for the claim that, for females, the pathway from interpersonal risk to offending is mediated through internalizing problems. In contrast, the pathway from interpersonal risk exposure to offending is less strongly mediated by internalizing for males. Because anxiety is a potentially modifiable internalizing problem, this study has important implications for future research and contributions to rehabilitation program decisions.

First, in line with expectations, maternal hostility had greater consequence for female internalizing than for male internalizing problems. Previous studies demonstrated females' strong relationship interest, noting that females' reaction to interpersonal violence at home is stronger than males' (Paquett & Underwood, 1999). This relationship interest appears to be socially and biologically based. In fact, Gore, Aseltine Jr., & Colten (1993) reported that females had a stronger association between interpersonal family stress and depressive symptoms than males did, and this association was partially due to their higher orientation towards interpersonal caring. Parental relationships, in particular, are salient for adolescents, as parents are meant to be a primary source of care, shelter, and provision. Adjudicated adolescent females report higher maternal conflict than adjudicated males (Henggeler, Edwards, & Borduin, 1987); this finding was supported by the current study. Furthermore, previous work demonstrated that maternal hostility predicts daughter's depression more strongly than son's depression (Lewis, Collishaw, Thapar, & Harold, 2014). Findings from the current study suggest that this association may apply to anxiety as well.

Biologically, the tend-and-befriend theory (Taylor, Klein, Lewis, & Gruenwald, 2000) suggests that female interest in relationships can be partially attributed to higher levels of oxytocin, which increases affiliative feelings towards others. Moreover, Taylor (2006) suggests that oxytocin released under stressful conditions may be associated with greater bio-behavioral stress responses. Slavich, Tartter, Brennan, & Hammen (2014) also found that endogenous opioid systems- expressed through the AA118G genes and single-nucleotide polypeptide (SNP) variants and related to reward systems- moderate the



effect of specific social rejection on depressive symptoms. In other words, social pain in depressive patients is related to neurobiological reward systems. Perhaps the current finding of a strong association for females between maternal hostility and anxiety symptoms occurs because relationship stressors are particularly salient for adolescent females relative to males.

The second primary result is that the effect of maternal hostility on offending is partially mediated by anxiety symptoms for female, but not male adolescents. More maternal hostility is related to more anxiety symptoms and more offending behavior. In a longitudinal study, Leadbeater, Kuperminc, Blatt, & Hertzog (1999) found that interpersonal strain in relationships with parents and peers predicted adolescent female internalizing problems; the strength of relationship between interpersonal risk and internalizing was stronger for females than males. The current study extends this work to suggest that maternal hostility, specifically, is related to internalizing, and consequently, offending. In line with Leadbeater et al.'s (1999) findings, this mediation path is significant for females but not males. The third primary finding is that general community victimization increases risk for both male and female offending, and adjudicated males in this sample report greater exposure to community victimization.

While gender differences in the etiological pathways from risk to offending were similar for both anxiety and depression, a surprising and noteworthy result was revealed. That is, there was an association between anxiety symptoms and offending behavior, but not between depressive symptoms and offending. This difference is notable in light of previous research suggesting a key difference between anxiety and depression is the state

of activation. Anxiety is characterized by an activation state, or hyper-arousal that can lead to reactivity in a threatening situation. This reactivity has been associated with aggression and other antisocial behavior (Knight, Guthrie, Page, & Fabes, 2002). On the other hand, depression is typically characterized by hypo-arousal and less activated states. Someone experiencing depressive symptoms would be less likely to act out in a threatening situation (i.e., behavioral activation), and more likely to retreat to symptoms like rumination and a low energy state (i.e., behavioral inhibition). In other words, the behavioral activation system is dysregulated (Kasch, Rottenberg, Arnow, & Gotlib, 2002). The high rates of co-morbidity between anxiety and depression (e.g., Brady & Kendall, 1992) and differences in the activation state (Kasch et al., 2002) warranted the study of both anxiety and depression in separate models.

Gender differences in level of exposure to interpersonal risk likely partially account for gender differences in offending behavior (Ariga et al., 2008; Messina & Grella, 2006). These findings are supported, in part, by the results of the current study. Overall, females offend and are adjudicated less than males are. This gender difference is likely due in part to their lower exposure to general victimization. In fact, general victimization mediated the pathway from gender to offending behavior. In the current sample, females experienced lower general victimization, which contributed to their lower offending variety. This result supports previous findings that males experience more exposure to community violence- they tend to be less closely monitored by parents and neighborhood communities (Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Svensson, 2003), and are consequently exposed to more community level victimization.

The gender-moderated mediation from maternal hostility to anxiety to offending would suggest that, in addition to different levels of risk, the mechanisms of the association between exposure to interpersonal risk and offending vary by gender. Thus, when females do offend, it appears to be related to exposure to general victimization and maternal hostility and occur primarily via anxiety. In other words, females and males experience differences in level of exposure to interpersonal risk as well as different pathways to offending.

### **Strengths and Limitations**

In spite of the apparent gender differences in adolescent offending behavior, few studies have evaluated gender differences in risk factors for male and female adolescent offending as the current study does. Analyses in this study control for a number of factors that could contribute to gender differences in offending, and the use of propensity score matching allows the analyses to retain sufficient power to detect meaningful relationships. Compiling two samples allows for a larger sample size and, thus, the consideration of more complex explanatory models.

This study is limited by its' cross-sectional design, so the hypothesized models are correlational and not directional. However, early victimization is consistently associated with higher levels of criminality (Dierkhising et al., 2013), lending support to the hypothesized pathway leading from exposure to interpersonal violence to internalizing in the current study. Future studies would benefit from longitudinal designs to further elucidate this pathway.

Furthermore, while the use of two datasets allowed for an increase in the sample size of the study, the use of secondary data inherently limits the measures that can be used. It would be useful to use clinical measures of internalizing problems in order to better understand benefits and challenges in the diagnosis and treatment of young offenders; for example, clinical cutoff scores may determine the type of treatment youth receive, rather than symptom level. While internalizing symptomology is important and indicative of current problems, clinical measures would be useful in cost-benefit analysis of certain treatments.

Another example of the limitations of secondary data measures, and the constructs incorporated into the current study, is the possibility that adjudicated youth under-report criminal activity. I addressed this concern in two ways. First, I elected to use offending variety as a measure of offending, as it is a preferred and reliable indicator (Hindelang et al., 1991; Thornberry & Krohn, 2000). Second, I examined collateral records from a subsample of youth in the current study ( $n = 158$  females,  $n = 979$  males), for constructs that were available. Collateral respondents included people who the target youth knew well, and were mostly parents (82%), female relatives (7%), or other close relatives or friends. Responses were adequately correlated for victimization ( $r = .29, p < .01$ ), perceived parental knowledge ( $r = .31, p < .01$ ), impulse control ( $r = .17, p < .01$ ), and offending variety<sup>1</sup> ( $r = .30, p < .01$ ). Furthermore, the pattern of correlations among community victimization, parental knowledge, impulse control, and offending variety

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<sup>1</sup> Offending variety for this subsample was calculated as the proportion of 24 items that the participant endorsed, or the collateral informant endorsed for the participant. This version of the measure is a more extensive measure than that included in Studies 1 and 2, due to constraints of combining two samples.

were in the same expected direction for both the participants and collateral informants (see Appendix D), suggesting self-report measures were adequate indicators of predictors, mechanisms, and offending in this study.

One other consideration in the interpretation of community violence is the operationalization of community violence. In the current study, community violence included sexual victimization as it was a compound variable. Because it includes sexual victimization, it may be confounded with family violence, as acquaintances and family members are unfortunately common perpetrators of this offense (Fisher, Cullen, & Turner, 2000; Basile & Saltzman, 2002). Also, females are also disproportionately exposed to sexual violence (Kerig et al., 2009). Finally, researchers report sexual victimization is uniquely related to specific types of offending behavior; and sexual offending is related to different risk factors for males and females, and different risk factors for sexual offending vs. non-sexual offending (Miccio-Fonseca, 2008). Thus, the community victimization variable in the current study may be biased towards females. While beyond the scope of the current study to disaggregate victimization by sexual and non-sexual categories, as well as offending behavior by sexual and non-sexual crimes, future work would benefit from using additional measures of general victimization exposure that can be disaggregated by trauma type.

### **Implications**

These findings support the understanding of justice-involved adolescents by providing a cross-sectional snapshot of one (of many) mechanistic, gender-sensitive, pathway to offending using the potentially malleable mediator of anxiety problems. In

particular, the finding that females' pathway from exposure to interpersonal violence (and specifically, maternal hostility) to offending occurs through anxiety problems. Prevention programs for at-risk females may benefit from a focus on victimized youth, parent-adolescent relationships, and the potential for internalizing problems, in order to disrupt this pathway before it manifests in disruptive offending behavior. Similarly, juvenile justice facilities should continue to be sensitive to the potential for adjudicated females to have trauma history and internalizing problems, and cater their programs appropriately.

Future studies would benefit from longitudinal designs incorporating gender differences to help determine causality of the relationships among risk factors and behavioral outcomes, inclusion of clinical measures and the consideration of alternative explanations. For example, adolescent peer and romantic relationships play critical roles in adolescents' behavior choices. Also, distinguishing the relationships between types of trauma and types of offending behavior may provide deeper understanding of specific etiological pathways. Future studies should consider these relationships longitudinally in order to establish the directionality of these models.

In conclusion, gender differences in the etiology of offending behavior help explain why females are adjudicated less frequently than males. Furthermore, the identification of these gender differences can inform the design of effective prevention and rehabilitation programs for the rising proportion of incarcerated adolescent females. Specifically, females' exposure to family violence increases their risk for internalizing and consequent offending. Anxiety in particular partially explains the risk for association between exposure to maternal hostility and offending. Males, on the other hand, report

higher exposure to community victimization, which contributes to their higher reports of offending. Unfortunately, it is beyond an outsider's control to change a youth's past experience of maternal hostility and/or community interpersonal violence; however, this study promisingly suggests that modifying a mechanism such as anxiety may at the very least contribute to healthier adolescent behavior choices.

## **Chapter Seven: Study 2 Abstract**

Promisingly, national prevention and rehabilitation efforts occurred in conjunction with overall decreases in rates of adjudication from 1996 through 2011 (National Center for Juvenile Justice, 2011). However, even as our knowledge about female offending grows, the increase in female juvenile offending suggests that prevention and rehabilitation efforts lack comprehensive knowledge to serve this population. The purpose of this study is to examine associations between interpersonal risk factors – low parental knowledge of youth behavior, community victimization, maternal hostility, – and offending behavior. Specifically, I examine the pathway from interpersonal risk factors to offending via psychological and behavioral traits – impulse control and substance use. The proposed model accounts for differences in level of exposure to risk and gender differences in associations among interpersonal risk factors, mechanisms, and offending. The hypothesis that impulse control and substance use would mediate the relationship between interpersonal risk and offending for females, whereas males would experience a direct relationship between interpersonal risk factors and offending, was partially supported. A cross-sectional design with  $n = 219$  adjudicated girls and  $n = 1,094$  adjudicated boys was implemented in order to compare the gender-related effects of several theoretically relevant interpersonal risk factors (exposure to



community victimization, family violence, parental knowledge of youth behavior) and mediators (impulse control, substance use) on offending for adjudicated youth. The proposed models used propensity scores to control for non-random gender assignment and were tested with Structural Equation Modeling. The model fit the data well, ( $\chi^2(8) = 93.04, p < .001$ ; RMSEA = .09; CFI = .96). Results indicate that the effect of parent-adolescent relationships on offending is mediated by impulse control and substance use. This pathway is stronger for females than males. These gender differences in etiological pathways to offending have implications for understanding rates of adolescent offending and recidivism.

## **Chapter Eight: Study 2 Introduction**

Adolescent offending exacerbates risk for a lifetime of recidivism, substance abuse, and mental health challenges. These challenges are costly to victims, offenders, and society. Promisingly, national prevention and rehabilitation efforts occurred in conjunction with overall decreases in rates of adjudication from 1996 through 2011 (National Center for Juvenile Justice, 2011). Targeted high-quality residential facilities provide treatments that lead to improvements on measures of psychosocial adjustment, such as impulse control and suppression of aggression (Dmitrieva, Monahan, Cauffman, & Steinberg, 2012). In turn, reductions in recidivism allow adolescents opportunities to contribute productively to society.

Even as our knowledge about female offending grows, the increase in female juvenile offending suggests that prevention and rehabilitation efforts lack comprehensive knowledge to serve this population. While the need for attention to gender differences in juvenile offending is acknowledged, the field lacks clarity. That is, the etiology of female offending behavior is still unclear. The purpose of this study is to examine associations between interpersonal risk factors – low parental knowledge of youth behavior, community victimization, and maternal hostility – and offending behavior. Specifically, I examine the pathway from interpersonal risk factors to offending via intermediary

psychological traits and behaviors of low impulse control and high substance use. The proposed model accounts for gender differences in level of exposure to risk and associations among interpersonal risk factors, mechanisms, and offending.

Decreases in rates of adjudication appear to be greater for male offenders. Indeed, the proportion of females in the juvenile justice system declined 23% less than that of males between 1996 and 2011 (National Center for Juvenile Justice, 2011). The increasing proportion of adolescent females in the justice system is recognized by practitioners and researchers. As such, there are more prevention, treatment, rehabilitation, and incarceration programs that focus on female needs than there have ever been. In fact, Welch, Roberts-Lewis, & Parker (2009) outlined a multi-level risk framework suggesting that treatment for female offenders should: be sensitive to females' victimization history, attend to demographics (e.g., race, ethnicity, and culture), endorse relationship skills, incorporate strengths-based programming, include input from participants, and be accessible for females with physical or learning disabilities. This framework indicates that females' unique needs often result from differential exposure and response to specific risk factors. Supporting these young offenders is paramount to reducing their risk of recidivism while reducing society's expense of incarceration and rehabilitation.

### **Theoretical Background**

Various theories highlight risk factors for adolescent offending that include self-control (Gottfriedson & Hirschi, 1990), peer deviance (Dishion, 1999), and life course perspectives (Sampson & Laub, 2005). Feminist perspectives such as Owen and Bloom

(1995), and trauma-informed perspectives (e.g., Kerig & Becker, 2005) claim females experience unique risk factors such as high interpersonal violence exposure and resulting Post-Traumatic Stress Disorder (PTSD), substance use, and offending behavior. Each of these theories is based primarily on single-gender studies that do not compare males and females. Based on these theoretical perspectives and a dearth of empirical examination of gender differences, it is evident that more work is needed to highlight gender differences in offending etiology in order to explain gender differences in offending behavior.

Differences in female and male rates of offending may be understood in two separate yet complementary ways that draw from the General Theory of Crime, Life Course Perspective, Triple Threat, and trauma-informed perspectives. First, gender differences in level of exposure to interpersonal risk factors may explain why there are more adjudicated males than females. Stated simply, if males experience more cumulative risk, then they would be more likely to offend, and vice versa. Research supports this explanation. For example, Dmitrieva, Chen, Greenberger, Ogunseitan, and Ding (2011) show that males' greater exposure to violence and experience of less parental monitoring relative to females' psychosocial risk explains the effect of biological risk factors on offending behavior. Using this explanation, males' greater exposure to risk contributes to their increased rate of offending. Yet, findings regarding exposure to interpersonal risk factors suggest females are exposed to more direct relational violence (e.g., maternal hostility), co-morbid psychiatric disorders that place them at risk for offending, and family history of mental illness than adjudicated males, another known risk factor for offending (McCabe, Lansing, Garland, & Hough, 2002). Taken together,

these findings would suggest that males are at greater risk for general violence exposure in the community, while females are exposed to greater risk for interpersonal violence in close relationships and co-morbid disorders related to offending. Thus, gender differences in *level* of risk exposure are apparent and may partially explain gender differences in offending behavior. However, this explanation does not account for gender differences in mechanisms connecting the *interpersonal risk* → *offending* link.

The second explanation for gender differences in levels of offending is as follows: the pathway from interpersonal risk factors to offending can be explained by intermediary psychological trait and behavioral phenotypes, and there are gender differences in the strength of these mediational pathways. In fact, there is evidence suggesting that impulse control and substance use explain the association between interpersonal risk factors and offending for both males and females, but with different magnitudes of association among risk and offending. Specifically, findings suggesting females' greater interest in relationships compared to males (Roy, Benenson, & Lilly, 2010), perhaps indicate that interpersonal risk factors have more consequence for females' psychological traits (i.e., impulse control), than for males. If males have a direct association between risk factors and offending, than their reaction to these factors would be offending, while females may experience a longer pathway to arrive at similar (offending) behavior. In other words, etiological mediation pathways through psychological traits and behaviors may be stronger for females than males. Until now, the gender differences in this mediating pathway have never been tested. The current study aims to examine gender differences in psychological traits in relation to juvenile offending.

## **Interpersonal Risk Factors**

**Interpersonal Violence.** Among other risk factors, interpersonal violence often precedes adolescent offending in both females and males (Johansson & Kempf-Leonard, 2009). In fact, 90% of offenders report a history of at least one interpersonal violence experience (Abram, Washburn, Teplin, Emanuel, Romero, & McClelland, 2007; Ford, Hartman, Hawke, & Chapman, 2008). Sixty-two percent of violence against youth occurs first before the age of five. And, many offenders report chronic victimization and/or multiple types of violent experiences (Dierkhising, Ko, Woods-Jaeger, Briggs, Lee, & Pynoos, 2013). Finally, interpersonal violence (though it carries different names across theories and empirical works) is considered a substantial contributor to offending behavior in a major theories of offending. For example, the General Theory of Crime (GTC; Gottfredson & Hirschi, 1990) suggests low impulse control and the *opportunity* to commit crime contribute to offending behavior, and parent-child relationship, including parental hostility, contribute to the development of self-control. Life Course Perspectives (Sampson & Laub, 2005) note that developmental milestones and risk, such as an incident of domestic abuse, are critical junctures where youth can either decide to abstain from or engage in offending. Triple Threat Theory (Owen & Bloom, 1995) claims females experience multiple facets of racial, economic, and social marginalization, including trauma, that contribute to their offending behavior. Finally, trauma-informed perspectives (Kerig & Becker, 2005) explain that interpersonal violence contributes to PTSD and interrupted cognitive, emotional, and social development, and is associated with offending behavior for youth and adults. Thus, interpersonal violence provides a key

element in search of a snapshot of a nuanced pathway to offending that can inform future research, policy, and practice.

Interpersonal violence is defined as a situation in which individuals feel threatened or unsafe as a result of acts that are intended to harm. The current study focuses on general community victimization and family violence. General victimization includes direct experience of being chased, robbed, mugged, or beat up in the community (Buka, Stichick, Birdthistle, & Earls, 2001). Family violence includes physical or verbal abuse in the family (specifically, maternal hostility). Many youth offenders have experienced community victimization and/or family violence.

*Gender differences in level of exposure to risk.* Among adolescents, gender differences in exposure to violence appear to vary by sample (adjudicated vs. non-adjudicated). Non-adjudicated adolescent females and males report similar levels of exposure to community victimization (Moffit, 2001), with females in the community reporting similar or more sexual assault and relationship violence than males (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Adjudicated adolescent males report experiencing more community risk and witnessing violence more than adjudicated females (Stein et al, 2003). Adjudicated adolescent females are directly victimized (rather than witnessing violence) more often than offending males (Cauffman, Feldman, Waterman, & Steiner, 1998; Ariga et al., 2008; Messina & Grella, 2006) and non-offending female counterparts (Owen & Bloom, 1995). In particular, Van der Laan & Van der Schans (2004) found that among arrested youth, females were exposed to more *family* risk factors than males. Taken together, adjudicated adolescent males appear to

experience similar or more interpersonal violence in the form of community victimization compared to females, while females experience similar or more family violence compared to males.

**Parental Knowledge of Adolescent Behavior.** Lack of parental knowledge about adolescent activities also places youth at risk for offending behavior. The General Theory of Crime (Gottfredson & Hirschi, 1990) suggests that parents instill values of self-control in their children, but also have the responsibility of providing sufficient supervision to protect youth from engaging in offending. Social control and personal capital theories (Nagin & Paternoster, 1994) suggest that positive parental control attempts such as consistent discipline, supervision, and monitoring of adolescent behavior (Barnes & Farrell, 1992; Farrell & Barnes, 2000; Rollins & Thomas, 1979), taken together with other social control factors such as, prosocial peer attitudes (Barry & Wentzel, 2006) and presence of a non-offending partner (Woodward, Fergusson, & Horwood, 2002) prevent individuals from committing crimes by providing social norms to which adolescents adhere. Likewise, the absence of parental knowledge about adolescent behavior has been studied extensively as an important correlate of adolescent offending. In addition to maladaptive social norms established when parents are not engaged in their children's activities, lack of parental knowledge increases unsupervised time, providing more opportunity for youth engagement in offending behavior. That is, an adolescent might be more likely to engage in risky behavior if he or she did not expect to be caught and/or disciplined for this behavior. Indeed, higher perceived parental knowledge and monitoring of adolescent behavior is associated with lower subsequent alcohol misuse



(Barnes, Reifman, Farrell, & Dintcheff, 2000) and delinquency (Dishion, Patterson, Stoolmiller, & Skinner, 1991; Patterson & Stouthamer-Loeber, 1984).

*Gender differences in (lack of) parental knowledge.* Parental support and knowledge are influential for offending in both genders. However, females tend to be monitored more closely by parents than males (Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Svensson, 2003). This social control may explain why females offend less than males. The effect of parental monitoring on delinquency was also stronger for females than males in a multi-method study of adolescents (Pettit, Laird, Dodge, Bates, & Criss, 2001). Similarly, Wong et al. (2013) found that low parental knowledge about youth activities and lack of positive parenting were risk factors for female but not male offending. Therefore, parental knowledge may have greater implications for females than males.

### **Mechanisms Connecting Risk Factors to Offending**

Psychological traits have received attention for their ability to explain the link between interpersonal risk and offending behaviors. In particular, impulse control (Gottfredson & Hirschi, 1990) and substance use (Mulvey, Schubert, & Chassin, 2010) have been named as risk factors for offending among males and females. For example, among a sample of high-risk females, lower parental monitoring was related to more risky sexual behaviors and drug use (DiClemente et al., 2001). Gender-related variability in these etiological pathways warrant more examination.

## **Impulse Control**

The association between low impulse control and greater offending behavior among adolescents is consistently supported. Impulse control is a component of the larger concept of self-control/ self-regulation and refers to the ability to inhibit urges. This includes inhibition of urges with detrimental outcomes, such as theft, fighting, or other offending behavior. Theoretically, Gottfredson and Hirschi (1990) were the first to make a strong connection between self-control and offending in their General Theory of Crime, suggesting that offending behavior is rooted in low self-control. They purported that more self-control allows individuals to consider the consequences of their actions, while those with less self-control act before thinking about consequences. Empirically, the link between impulse control and offending has been supported regularly in studies of males (e.g., Steiner et al., 1997), and females (e.g., Cauffman, Feldman, Waterman, & Steiner, 1998). Developmentally, females consistently self-report better impulse control than their male counterparts in community samples (Shulman, Harden, Chein, & Steinberg, 2015). Yet, clarity around the effect of impulse control on offending among males and females is unclear.

**Impulse control as mediator between interpersonal risk factors and offending.** There is evidence to suggest greater exposure to risk reduces impulse control and consequently contributes to more offending (van der Kolk, Roth, Pelcovitz, & Sunday, 2005). In particular, youth who are exposed to interpersonal violence may experience increased risk for disruptions to socio-emotional development, resulting in maladaptive attention bias and poor cognitive inhibition (i.e., in the context of the current

study, poor impulse control). Poor impulse control contributes to aggression and elevated rates of offending problems (White, Jarrett, & Ollendick, 2013). Similarly, Ford and colleagues repeatedly found that youth with multiple victimization experiences exhibit offending due to impairments in self-control, including problems with impulse control (Farrington, 1993; Ford et al., 1999; Ford et al., 2009; Ford, Fraleigh, & Connor, 2010; Ford, Hartman, et al., 2008; Mongillo, Briggs-Gowan, Ford, & Carter, 2009). Likewise, adolescents who offend more frequently and are involved in greater variety of offending behaviors tend to report lower warmth in relationships with their parents, and high levels of hostility (Cochran et al., 1998; Feldman & Weinberger, 1994; Gibbs et al., 1998; Hope & Chapple, 2005; Brannigan et al., 2002; Hay, 2001; Unnever et al., 2003; Zhou, Eisenberg, Wang, & Reiser, 2004). Impulse control has been found to mediate the relationship between parental hostility and offending among a sample of adolescent boys (Feldman & Weinberger, 1994). Similarly, Jones, Cauffman, and Piquero (2007) found that poor parent-adolescent relationships predicted offending behavior via self-control. In sum, this evidence suggests that impulse control mediates the relationship between exposure to interpersonal violence (community or family) and offending behavior for adolescent males.

Similarly, empirical work indicates that low parental knowledge of adolescent activities is associated with poorer impulse control and more offending. For example, the combination of low parental monitoring and high exposure to violence predicted lower self-control, which then contributed to negative social outcomes (Gibbs, Giever, & Martin, 1998; Hay, 2001; Vazsonyi & Huang, 2010). Consistent parenting allows for

children to understand repercussions to their actions, and models disciplined and thoughtful actions, while inconsistent parenting makes the connections between behavior and consequences unclear for youth. In other word, parental knowledge of adolescent activities may be indicative of the overall quality of the parent-adolescent relationship. To the extent of my knowledge, no study has evaluated gender differences in the role of impulse control as a mediator of the effects of interpersonal risk factors on offending.

### **Substance Use**

The positive association between substance use and abuse and offending behavior is (unsurprisingly) high. This association is exemplified by the longitudinal Pathways to Desistance study, which followed a sample of over 1,300 adjudicated youth. In this sample of offenders, over 80% of adjudicated youth had used alcohol and/or marijuana in their lifetime. Nearly 25% of the youth had used hallucinogens, cocaine, or sedatives. Finally, 5-15% of youth had used other drugs. Deeper exploration revealed that more serious offenders reported more chronic patterns of substance use (Mulvey, Schubert, & Chassin, 2010).

Impulse control, substance use, and aggression have similar etiological factors (Brady, Myrick, & McElroy, 2010). Additionally, less self-control was found to be related to more alcohol abuse (Tangney, Baumeister, & Boon, 2008; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007). A longitudinal study of children found that youth with attention-deficit hyperactivity disorder (ADHD; characterized by low impulse control and high inattention) had elevated risk for alcohol abuse compared to their peers

without ADHD (Brooke & Pelham Jr., 2003). Thus, impulse control and substance use are closely linked.

***Substance use as a mediator between interpersonal risk factors and offending.***

There is evidence suggesting substance abuse may mediate the path from interpersonal risk to offending. For example, individuals with post-traumatic stress disorder as a result of victimization are more likely to self-medicate with illicit drugs (Covington & Kohen, 1984), which, in turn, is associated with later deviance (Brook, Whiteman, Finch, & Cohen, 1996). Similarly, parental hostility in conflictive and aggressive homes is predictive of greater risky adolescent behavior, including substance use (Repetti, Taylor, & Seeman, 2002).

Females are less dependent on substances than males overall (Mulvey, Schubert, & Chassin, 2010), though it is unclear which gender engages in more substance use. Females typically take more interest in relationships than do males (Roy, Benenson, & Lilly, 2010). Thus, females are more likely than males to change their substance use in accordance with expectations of a relationship. For example, females may become involved in drug use to maintain a relationship (Covington & Surrey, 1997), or cope with hostility in a parent-adolescent relationship.

General community victimization, maternal hostility, parental monitoring, impulse control, and substance use have all been linked to each other and ultimately to offending behavior. It would be rational to expect that high exposure to community victimization and family violence, and lack of parental knowledge, are associated with low impulse control, more substance use, and higher levels of offending behavior.

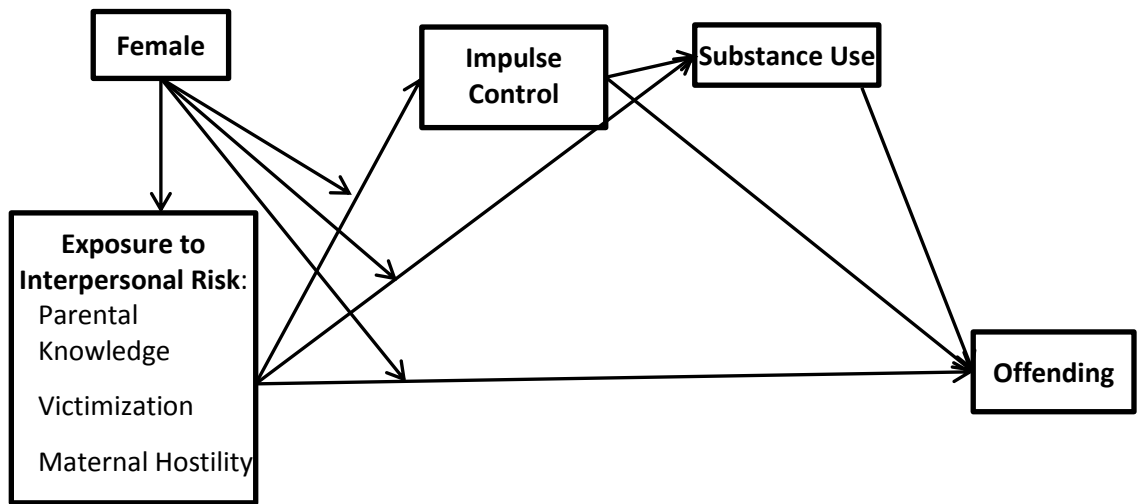
However, no study (to my knowledge) has formally tested substance abuse as a mediator of the path from interpersonal risk to offending, nor tested the gender differences in this path. Though this mediation has not been tested, it appears that individuals who are traumatized may self-medicate with the use and abuse of substances, which in turn is associated with consequent offending.

### **Current Study**

The aim of current study is to examine the pathway from interpersonal risk to offending via impulse control and substance use while accounting for gender differences in the associations among these variables. Specifically, I aim to test the extent to which impulse control and substance use mediate the relationship between interpersonal risk factors and offending for adjudicated adolescent males and females. This question is examined with a sample of adjudicated adolescent youth who participated in the study in several locations around the nation. A cross-sectional design is used to simultaneously test the associations among risk factors for female and male adolescent offenders. Figure 2.1a demonstrates the hypothesized associations.

### **Hypotheses**

- 1. Pathways to offending.** As seen in Figure 2.1a, the pathways from parental knowledge, maternal hostility, and victimization to offending are partially mediated by impulse control and substance use; accounting for gender differences in levels of exposure to interpersonal risk.



*Figure 2.1a.* Proposed theoretical model. Interpersonal risk predicts offending through impulse control and substance use; this mediational path is moderated by gender.

## **2. Gender differences in level of interpersonal risk exposure.** Gender

differences in offending are partially accounted for by gender differences in the levels of exposure to risk factors. I expect findings to mirror previous studies: females report higher parental knowledge of their behaviors than males (Roy et al., 2010). Females also experience similar (Moffitt, 2001) or lower (Dmitrieva et al., 2011) community victimization, but more family violence in the form of maternal hostility (Kerig et al., 2009). Gender differences in exposure to risk factors contribute to gender differences in overall rates of offending.

## **3. Gender differences in strength of mediation pathways.** Gender differences

in associations among interpersonal risk factors, psychological traits, substance use, and offending, are to be explored. Parental knowledge, exposure to community victimization, and maternal hostility are associated with impulse control, substance use, and offending differently for females

than males. Based on the literature reviewed, two competing sub-hypotheses about gender differences in the strength of the mediation pathways (*risk* → *impulse control* → *substance use* → *offending*) are possible in this exploratory part of the study (3a vs. 3b).

**3a.** Since females emphasize relationships and relationship quality, perhaps relationship-related risk matters more for females than males. If so, then lack of parental knowledge has a stronger association with impulse control and substance use, and downstream offending behavior, for females than males. Meanwhile, parental knowledge directly predicts male offending more strongly than female offending. Similar patterns of findings occur for community victimization and maternal hostility. That is, more community victimization and maternal hostility would be associated with poorer impulse control, more substance use, and greater offending behavior for females relative to males. The pathways from *interpersonal risk factors* → *impulse control* → *offending*, the pathways from *interpersonal risk factors* → *substance use* → *offending*, and the pathways from *interpersonal risk factors* → *impulse control* → *substance use* → *offending*, are stronger for females than for males.

**3b.** Alternately, because of the prominence of impulse control in male-focused theories of antisocial behavior, impulse control may more strongly mediate the pathway from interpersonal risk exposure to offending for them, relative to their female counterparts. This would indicate males are more responsive to



external influence on their behavior (i.e., parental knowledge, community victimization, and maternal hostility). In this case, the pathways from *interpersonal risk factors* → *impulse control* → *offending*, the pathways from *interpersonal risk factors* → *substance use* → *offending*, and the pathways from *interpersonal risk factors* → *impulse control* → *substance use* → *offending*, are stronger for males than for females.

## Chapter Nine: Study 2 Method

### Participants

The sample consisted of adolescent juvenile offenders from the Girls in Transition Study (a study of adjudicated adolescent females in Colorado) and the Pathways to Desistance Project (a study of adjudicated adolescent male and female offenders in Arizona and Pennsylvania; Mulvey et al., 2004). Participants were drawn from two samples for three primary purposes. First, the combination of two samples allowed for the augmentation of the sample size; in particular, it is difficult to recruit a sufficient sample of female offenders because there are fewer adjudicated female than male adolescents. Second, the addition of the Pathways to Desistance sample provided a large ( $n = 1,094$ ) comparison sample of adjudicated male adolescents. Third, while the two research programs were distinct, their interviewing protocols and measures were similar.

The combined sample consisted of 1,313 adjudicated youth (219 females) – with 47 females drawn from the Colorado sample, 83 girls and 533 boys from the Arizona sample, and 89 girls and 560 boys from the Pennsylvania sample.

**Sample characteristics.** As can be seen in Table 2.1, a third of participants (32%) were incarcerated at the time of the interview. Participants were on average sixteen and a half years of age, but were arrested for the first time on average at age ten and a half. Compared to females, males were arrested for the first time at a younger age than females

( $M = 10.31$ ,  $SD = 1.74$  for males and  $M = 11.50$ ,  $SD = 2.17$  for females,  $t(272.36) = -.87$ ,  $p < .001$ ). Participants came from diverse backgrounds, with 40% self-identifying as Black, 22% self-identifying as Hispanic/Mexican-American, and 22% identifying as White for the overall sample (see Table 2.1 for distribution by gender). Most participants came from homes with parents born in the US (81% of fathers and 90% of mothers were born in the U.S). Nearly half of the participants' biological parents had never been married (47%). The majority (61%) of adolescents reported being in a current romantic relationship. Also as can be seen in Table 2.1, female participants drawn from the Girls in Transition or Pathways to Desistance samples had some significant, albeit not dramatic, differences on demographic characteristics. The girls from Pathways to Desistance were one year younger and were arrested for the first time one year earlier than females in the Girls in Transition study. They also had a higher proportion of youth self-identifying as Black and Hispanic and their mothers had lower levels of education than females in the Girls in Transition study. Finally, a greater percentage of girls in the Girls in Transition sample was incarcerated relative to the Pathways to Desistance study.

Importantly, when the combined female sample was compared to males, there were fewer significant differences. Females and males did not differ on age, number of people living at home with them, the current rate of incarceration, parental marital status, current romantic relationship status, and mother being born in the U.S. Males were arrested for the first time one year earlier than females, more males self-identified as Black (42% for males vs. 34% for females) and Hispanic (34% for males and 28% for females). Females had slightly better educated mothers and their fathers were more likely

to be born outside of the U.S. These differences among males and females were accounted for by using propensity scores in all data analyses.

Table 2.1

*Sample Demographics*

Characteristic	Total	Male	Female	GIT	PD	Sex Differences	Sample Differences
	Mean (SD)					<i>t</i> (df)	
Age	16.58 (1.16)	16.56 (1.16)	16.67 (1.18)	17.38 (1.22)	16.47 (1.10)	-1.21 (1310)	4.90 (216)***
Age at First Arrest	10.51 (1.87)	10.31 (1.74)	11.50 (2.17)	12.98 (1.85)	11.08 (2.08)	-7.52 (272.36)***	6.07 (80.99)***
People at Home <sup>a</sup>	3.88 (1.97)	3.91 (1.97)	3.70 (1.98)	3.48 (2.23)	3.75 (1.91)	1.48 (1308)	-.83 (214)
	%					<i>X</i> <sup>2</sup> (df)	
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	<i>n</i> = 48	<i>n</i> = 171 <sup>b</sup>		
Incarcerated	32	31	35	98	18	1.53(1)	106.20 (1) ***
Race/Ethnicity						18.68(3)***	8.70 (3)*
White	22	20	31	44	27	-	-
Black	40	42	34	23	37	-	-
Hispanic/Mexican	33	34	28	21	30	-	-
Other	5	5	7	13	6	-	-

Characteristic	Total	Male	Female	GIT	PD	Sex Differences	Sample Differences
			%				$X^2(df)$
	<i>N</i> = 1313	<i>n</i> = 1094	<i>n</i> = 219	<i>n</i> = 47	<i>n</i> = 171 <sup>b</sup>		
<i>Parent Marital Status</i>						2.25(4)	2.54 (4)
Married	15	16	12	9	13	-	-
Separated	10	10	10	9	10	-	-
Divorced	22	22	23	28	22	-	-
Never Married	47	47	48	52	49	-	-
Other	6	6	6	2	7	-	-
<i>Maternal Education</i>						13.39(3)**	10.28 (3)*
Some grade school	12	13	7	4	8	-	-
Some high school	33	33	34	18	39	-	-
High School Diploma/GED	33	34	28	31	27	-	-
Post-Secondary Education	23	21	31		26	-	-
Current Relationship	61	61	64	56	65	.63(1)	1.38 (1)
Father born in US	81	80	56	86	86	4.09(1)*	0.00 (1)
Mother born in US	86	85	89		89	2.91(1)†	.22 (1)

GIT = Girls in Transition Sample; PD = Pathways to Desistance Sample

<sup>a</sup>Number of people at home in addition to participant

<sup>b</sup>For sample comparisons, only females were used since no males were included in the Girls in Transition sample

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

## Procedure

Eligible adolescents were recruited through local juvenile courts and other local youth correction/probation programs. Participants engaged in an in-person interview with a trained research assistant either at the facility where he or she was incarcerated or a community location (if the participant was not incarcerated), such as a mall or mutually agreed-upon fast food restaurant. Efforts were made to conduct interviews in places where others were not able to hear responses. The interviews included open-ended and scaled responses and lasted approximately two hours. Participating university IRBs approved all recruitment and assessment procedures for the study. Across both studies, participant reports were protected by the NIH Certificate of Confidentiality. Interviews were voluntary, and participants were able to refuse to answer questions without penalty. Participants from the Girls in Transition study were interviewed once during their first adjudication year (the mean number of months at the facility was 6.01,  $SD = 4.10$  months). Participants in the Pathways to Desistance study were interviewed every 6 months following their initial adjudication. To make samples comparable, whenever possible, 6-month follow-up data was utilized for participants from the Pathways to Desistance study. Demographic information such as parental citizenship and parental education were measured at baseline.

## Measures

**Community victimization.** The frequency of victimization incidents was measured using an adapted version of the Exposure to Violence Inventory (ETV; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998). The victimization score reflects the proportion of lifetime violent events youth experienced as victims. The scale included four items in the Girls in Transition study (being chased with intent to hurt, being beaten up or mugged, being attacked with a weapon, and being raped or sexually attacked) and six items in the Pathways to Desistance study (with two additional questions about being shot at or shot). The scale responses were standardized within each study sample in order to aid comparability. Higher scores indicate greater victimization.

**Maternal hostility** was assessed with a mean of 12 items adapted from the Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994). Participants were asked how frequently their mothers engaged in a variety of hostile actions, such as throwing things at youth or insulting and swearing at youth, on a scale from 1 (*never*) to 4 (*often*). The scale had good-to-excellent internal consistency,  $\alpha = .93$  for the Girls in Transition sample and  $\alpha = .80$  for the Pathways to Desistance sample.

**Perceived parental knowledge** was assessed similarly for both the Girls in Transition and the Pathways to Desistance samples. The Girls in Transition interview included 6 items (3 for maternal knowledge and 3 for paternal knowledge) that ascertained how often youths' parents knew who they spend their free time with, where they go out at night, and how they spend their money. Response categories ranged from 1



(*never/rarely*) to 4 (*always*). The scale had adequate internal consistency,  $\alpha = .80$ .

Participants from Pathways to Desistance study were asked similar questions, but with the stem of “how much does your parent know,” as opposed to the stem of “how often does your parent know” that was used in the Girls in Transition study. Response categories ranged from 1 (*doesn't know at all*) to 4 (*knows everything*). To aid comparability, scores were standardized within each sample before combining them into a single sample. Higher scores indicate greater parental knowledge of adolescent activities/behaviors.

**Impulse control** was assessed using an eight item subscale from the Weinberger Adjustment Inventory (Weinberger & Schwartz, 1990). Participants responded to questions such as "I say the first thing that comes into my mind without thinking enough about it." Response categories ranged from 1 (*false*) to 5 (*true*) and 1 (*never*) to 5 (*always*). The scale exhibited adequate internal consistency,  $\alpha = .77$  for Girls in Transition sample and  $\alpha = .78$  for Pathways to Desistance sample.

**Substance use.** Participants reported frequency of alcohol, marijuana, and other drug use. Lifetime drug use was assessed with a yes/no question, and endorsed items were probed for frequency of use on a scale from 1 (*twice/day*) to 9 (*never*) using the Self Report of Offending scale (Huizinga, Esbensen, & Weiher, 1991). Participants reported lifetime frequency of using alcohol, marijuana, inhalants, and other drugs. Higher scores indicate greater lifetime substance use and use frequency.

**Offending** was assessed with items adapted from the Self-Report of Offending Scale (Huizinga, Esbensen, & Weiher, 1991). Participants reported lifetime engagement

in offending behaviors, such as theft, selling drugs, or assault. The number of items varied across the two samples, with Pathways to Desistance interview assessing engagement in individual offense types (e.g., an item assessing selling marijuana and a separate item assessing selling other illegal drugs) and Girls in Transition assessing engagement in grouped offenses (e.g. selling marijuana or other illegal drugs as a single item). Thus, although the two studies assessed engagement in the same range of illegal behaviors, the Pathways to Desistance study included eleven items and Girls in Transition study included six items. Participant responses were scored as the proportion of all possible offense types endorsed by the youth. This proportional variety score indicated the degree to which youth engaged in different types of offenses committed during their lifetime – a measure that is less prone to recall errors than frequency of offending scores (especially for high-frequency offenses such as theft) and represents a preferred method of measuring antisocial behavior (Hindelang, Hirschi & Weis, 1981; Thornberry & Krohn, 2000). Higher scores indicate greater engagement in a variety of offending behaviors.

## **Analysis Plan**

**Descriptive statistics.** Preliminary analyses focused on examining mean gender differences in the key study variables and exploring gender differences in the zero-order bivariate correlations. Gender differences in predictors, mediators, and outcomes were tested using t-tests and chi-square tests where appropriate. Gender differences in the bivariate correlations were tested with Fisher r-to-z transformations.

**Propensity scores.** Because males and females have unequal probability of engaging in antisocial behavior and being adjudicated in the juvenile justice system, all analyses controlled for spurious associations by using propensity score analysis. Propensity scores were created using logistic regression and used as a covariate in subsequent analyses. This method allows for use of a single control variable (i.e., the propensity score) rather than including a multitude of covariates that can provide alternative explanations for the association between gender and the key study variables (Hade & Lu, 2011). Propensity scores were created for each individual based on theoretically-relevant potential confounds. Specifically, age, age at first arrest, ethnicity, incarceration status at the time of the interview, living situation (number of people in home; parent marital status), maternal citizenship, maternal educational attainment, and romantic relationship status were used to calculate propensity scores.

**Structural equation modeling.** Structural Equation Modeling using MPlus Version 6.12 (Múthen & Múthen, 2011) was used to examine the hypothesized models. Figure 2.1a depicts the hypothesized relationships. According to the model, exposure to interpersonal risk (as assessed by parental knowledge, victimization, and maternal hostility) is associated with greater offending, and this effect is mediated by impulse control and substance use. Gender has an indirect effect on offending through exposure to interpersonal risk and by moderating the paths from exposure to interpersonal risk to impulse control, substance use, and offending. These moderated mediations were tested as advised by Preacher, Rucker, and Hayes (2007). Figure 2.1b provides an example of the paths that were involved in testing moderated mediation for one of the three exposure

to interpersonal violence variables (in actuality, the full model tested for the moderated mediations for perceived parental knowledge, victimization, and maternal hostility in a single model). Models controlled for propensity score and all exogenous variables were mean-centered to avoid multicollinearity in moderation analyses.

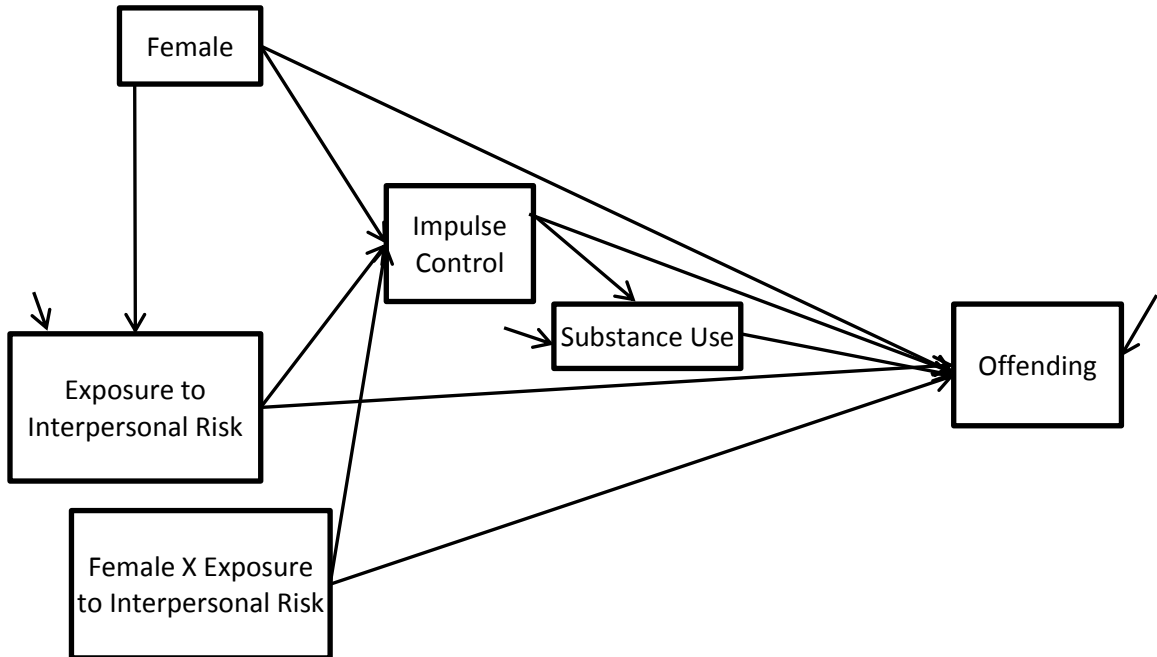


Figure 2.1b. Sample path diagram of 1 moderated mediation within the full model. Model adapted from Model 1 (Preacher, Rucker, & Hayes, 2007)

***Model modifications.*** After each model was tested, model fit indices were evaluated. Model fit was considered good if models yielded a Root Mean Square Error of Approximation less than .10 and a CFI greater than .90 (McDonald & Ho, 2002). Modification indices were inspected in order to identify additional correlations among predictors that should be included in the model order to improve the model fit. These correlations reflect shared variance in the predictors and mediators (e.g., victimization is

related to maternal hostility). With the addition of these correlations, model fit improved, resulting in a full model that fit the data well.

***Model trimming.*** The next step included trimming the model by removing insignificant interactions, in search of parsimony. Gender did not moderate the paths from victimization and maternal hostility to offending, and removing these interactions did not worsen the model fit. Thus, the trimmed model results were reported.

***Testing/Interpretation of moderated mediations.*** Indirect effects were assessed using bootstrapped estimates of 95% coefficient confidence intervals; this approach accounts for non-parametric sampling distribution for the estimates that are often present for indirect effects (Hayes, 2013). Bootstrapped confidence intervals were generated using 2,000 sample draws. Gender differences were approached in two ways. First, I tested whether gender had a direct and indirect effect on mediating and outcome variables by examining the significance of the direct and indirect paths from gender to other endogenous model variables. Second, I tested whether gender moderated the associations between various model paths. This examination involved (a) inspection of significant product term interaction variables and (b) tests of parameter constraints that examined gender differences among the indirect effects specified by the model. The former tested for gender differences in the direct effects specified by the model (e.g., do females have a stronger link than males from maternal hostility to substance use?). The latter tested for gender differences in the indirect effects (e.g., do females have a stronger than males indirect effect from maternal hostility to substance use, and then to offending?).

## **Chapter Ten: Study 2 Results**

### **Descriptives**

First, I tested whether females had higher or lower exposure to interpersonal risk, higher impulse control, lower substance use, and lower offending. As can be seen in Table 2.2, males reported more general community victimization experiences, but females reported experiencing higher maternal hostility. Males and females did not differ on their reports of perceived parental knowledge or impulse control. Not surprisingly, males reported more drug use and higher levels of offending than females.

As can be seen in Table 2.3, overall, lower exposure to interpersonal risk (higher perceived parental knowledge, lower maternal hostility, and lower victimization) was associated with greater impulse control, lower substance use, and lower offending behavior for both males and females. Furthermore, as expected, higher impulse control was related to lower substance use and offending; higher substance use was associated with higher offending. A detailed figure of the tested model with all unstandardized regression weights is presented in Appendix C.

Table 2.2  
*Sample Descriptives of Predictors and Outcomes.*

Predictors	Mean ( <i>SD</i> )			<i>t(df)</i>
	Total	Male	Female	Sex Differences
Parental Knowledge	0 (.85)	.02 (.83)	-.10 (.93)	1.65 (244.30)
Victimization	0 (1.0)	.05 (1.00)	-.24 (.93)	4.09 (325.63)***
Maternal Hostility	.003 (.39)	-.03 (.33)	.18 (.54)	-5.45 (241.07)***
<hr/>				
Mechanisms				
Impulse Control	0(.93)	-.01(.05)	.05(.97)	-.96 (1307)
Drug Use	3.14 (1.56)	2.18 (.15)	3.88 (2.18)	-.57 (245.40)***
<hr/>				
Offending	$\chi^2(df)$			
Offending Variety	.56 (.28)	.58 (.28)	.47 (.26)	5.50 (316.98)***
<hr/>				
	%			
	<i>N</i> = 1313	<i>n</i> =1094	<i>n</i> = 219	
Property offense	57	59	50	*
Drug Sale	36	38	3	**
Take Something by Force	45	49	26	***
Theft	75	75	72	ns
Weapon Use	27	29	18	**
Physical Fight	96	97	89	***

\**p* < .05 \*\**p* < .01 \*\*\**p* < .001

Table 2 3.

*Correlations of Predictors and Mediators with Outcomes*

<i>r</i>	Parental Knowledge	Victimization	Maternal Hostility	Impulse Control	Sub. Use	Offending
Parental Knowledge	1	-.16***	-.12***	.11**	-.28**	-.21**
Victimization	-.17*	1	.12**	-.24**	.42**	.51**
Maternal Hostility	-.21**	.16**	1	-.22**	.23**	.17**
Impulse Control	.36**	-.15*	-.25**	1	-.29**	-.31**
Substance Use	-.44**	.31**	.34**	-.28**	1	.50**
Offending	-.24**	.49**	.21**	-.29**	.48**	1

*Note.* Correlations for males are in the upper right corner of the table; correlations for females are in the lower left corner.

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Fisher r-to-z transformations revealed two gender differences in the magnitudes of these correlations. Parental knowledge appeared to be more strongly related to impulse control and substance use for females than males,  $z = 3.58$ ,  $p < .001$  for impulse control and  $z = 2.48$ ,  $p < .05$  for substance use. No other gender differences were significant.

### **The Moderated Mediation Model**

The full model (i.e., the model that included sex as a moderator of every model path) had a good fit,  $\chi^2(14) = 124.61$ ,  $p < .001$ ; RMSEA = .08; CFI = .96. The final trimmed model had excellent fit ( $\chi^2(8) = 93.04$ ,  $p < .001$ ; RMSEA = .09; CFI = .96).



Table 2 4.

*Unstandardized Regression Coefficients for the Moderated Mediation Model.*

	<i>b</i>	<i>SE</i>	Critical Ratio
Parental Knowledge regressed on Female	-.10	.07	-1.40
Maternal Hostility regressed on Female	.18***	.03	6.20
Victimization regressed on Female	-.38***	.07	-5.07
Impulse Control on			
Female	.13	.07	1.91
Parental knowledge	.07	.04	1.77
Maternal hostility	-.43***	.07	-6.11
Victimization	-.18	.03	-7.07
Female × Parental knowledge	.19*	.08	2.37
Substance Use on			
Female	.74***	.10	7.31
Parental knowledge	-.20***	.05	-4.19
Maternal hostility	.37***	.09	4.09
Victimization	.40***	.03	12.51
Impulse control	-.21***	.03	-5.98
Female × Parental knowledge	-.59***	.12	-4.99
Offending on			
Female	-.12***	.02	-6.85
Parental knowledge	-.02*	.01	-2.09
Maternal hostility	.02	.02	1.07
Victimization	.10***	.01	14.31
Impulse control	-.04***	.01	-5.94
Substance use	.06***	.01	10.79
Female × Parental knowledge	.04	.02	1.78
Female × Substance use	-.02	.01	-1.70

\* $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Parental knowledge.** As can be seen in Table 2.4, females did not differ from males in their reports of parental knowledge. However, there were significant gender  $\times$  parental knowledge interaction effects for impulse control ( $b = .19, p < .05$ ) and substance use ( $b = .59, p < .01$ ). As can be seen in Figure 2.2, higher parental knowledge was associated with higher impulse control for females, but not males. Similarly, parental knowledge was associated with greater reductions in substance use for females (Figure 2.3).

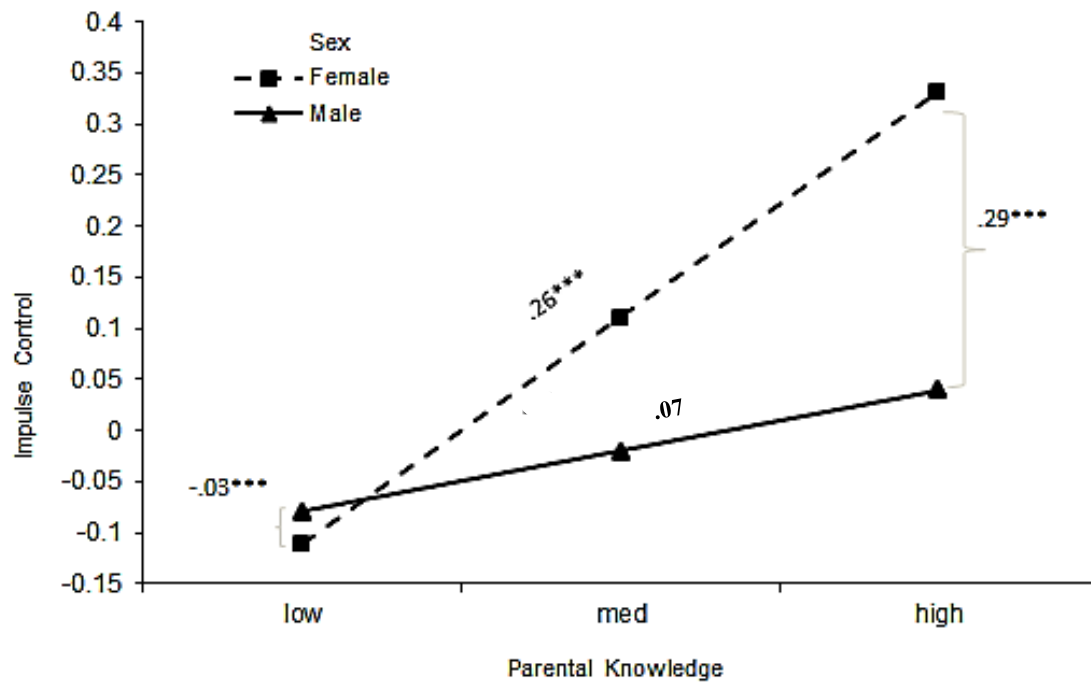


Figure 2.2. Sex moderates the effect of maternal hostility on anxiety symptoms. The effect of maternal hostility on anxiety symptoms is stronger for males than females.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

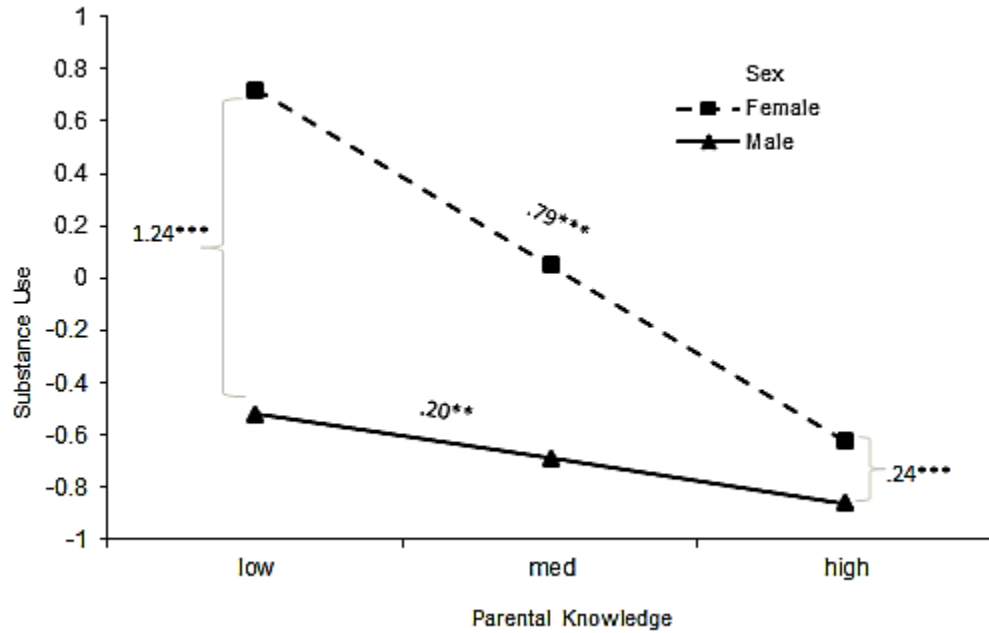


Figure 2.3. Sex moderates the effect of parental knowledge on substance use. The effect of parental knowledge on substance use is stronger for females than males.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Furthermore, there were gender differences in the magnitude of the indirect *parental knowledge*  $\rightarrow$  *impulse control*  $\rightarrow$  *offending* path ( $b = .01$ ,  $SE = .004$ ,  $p < .05$ ), with females having a significant indirect effect ( $b = -.01$ ,  $SE = .004$ ,  $p < .01$ ), but not males ( $b = -.003$ ,  $SE = .003$ ,  $ns$ ). Similarly the indirect *parental knowledge*  $\rightarrow$  *impulse control*  $\rightarrow$  *substance use* and *parental knowledge*  $\rightarrow$  *impulse control*  $\rightarrow$  *substance use*  $\rightarrow$  *offending* paths also differed by gender ( $b = .01$ ,  $SE = .004$ ,  $p < .05$  for the shorter and  $b = .002$ ,  $SE = .001$ ,  $p < .05$  for the longer indirect effects). Once again, the indirect effects of parental knowledge were significant for females ( $b = -.05$ ,  $SE = .02$ ,  $p < .01$  for shorter

and  $b = -.003$ ,  $SE = .001$ ,  $p < .01$  for longer indirect paths) but not for males ( $b = -.01$ ,  $SE = .01$ ,  $ns$  for shorter and  $b = -.001$ ,  $SE < .001$ ,  $ns$  for longer indirect paths). Thus, the levels of parental knowledge did not differ between males and females, but had stronger direct and indirect behavioral consequences for females than males.

**Maternal hostility and community victimization.** Females had higher exposure to maternal hostility ( $b = .18$ ,  $p < .001$ ) and lower general exposure to victimization ( $b = -.38$ ,  $p < .001$ ). These variables, in turn, had downstream behavioral consequences. Higher maternal hostility was associated with lower impulse control ( $b = -.43$ ,  $p < .001$ ) and higher substance use ( $b = .37$ ,  $p < .001$ ). Higher victimization was associated with higher substance use ( $b = .40$ ,  $p < .001$ ) and offending ( $b = .10$ ,  $p < .001$ ). Lower impulse control and higher substance use, in turn, were associated with higher offending ( $b = -.04$ ,  $p < .001$  for impulse control and  $b = .06$ ,  $p < .001$  for substance use). Gender differences in offending were expressed through the indirect pathway from *gender*  $\rightarrow$  *maternal hostility*  $\rightarrow$  *impulse control*  $\rightarrow$  *substance use*  $\rightarrow$  *offending* ( $b = .001$ ,  $SD < .001$ ,  $p < .01$ ). Thus, being a female was associated with having higher maternal hostility, which in turn contributed to lower impulse control, higher substance use, and higher offending. However, being a female was also associated with lower overall victimization, which in turn contributed to lower offending beyond the effects of impulse control and substance use (i.e., the *gender*  $\rightarrow$  *victimization*  $\rightarrow$  *offending* indirect path was negative and significant,  $b = -.04$ ,  $SE = .01$ ,  $p < .01$ ).

## **Chapter Eleven: Study 2 Discussion**

Even with recent efforts to support prevention efforts and rehabilitation of female adolescent offenders (OJJDP, 2011; Welch et al., 2009), few studies examine gender differences in the risk factors, protective factors, and mechanisms of offending. The current study targets this gap in knowledge by capturing a portion of the theoretically and empirically relevant pathways from family and community risk factors (i.e., parental knowledge of adolescent behavior, maternal hostility, and community victimization) to offending, through psychological traits and correlates (impulse control and substance use). Results indicate that the effects of parent-adolescent relationships on offending are mediated by impulse control and substance use. Parental knowledge has stronger consequences for females' impulse control, substance use, and offending, as compared to the effects of parental knowledge on males' associations between identified risks, mechanisms, and offending. Maternal hostility and community victimization have similar consequences for male and female outcomes. However, males' higher exposure to community victimization and females' higher exposure to maternal hostility contribute to gender differences in rates of offending. This study is an initial step in the process of understanding gender differences in the etiology of offending behavior has the potential to inform strong prevention, treatment, and rehabilitation efforts for young female offenders.

## **Gender Differences in the Effects of Risk Factors on Offending Mechanisms**

Several hypothesized pathways were supported by the results. Indeed, greater risk (i.e., lower parental knowledge, more maternal hostility and community victimization) was associated with poorer impulse control, more substance use, and greater offending behavior. These mediational pathways found in the current sample of adjudicated adolescents support prior work. For example, poor parent-adolescent relationships are related to greater offending behavior via low self-control (a construct which encompasses impulse control) in a series of studies demonstrating a partial mediation (Brannigan et al., 2002; Hay, 2001; Unnever et al., 2003; Zhou et al., 2004). That is, self-control partially explains the positive relationship between parent-adolescent relationships and offending behavior. The current study extends this previous work to imply substance use has explanatory power in the specific pathway of associations among risk factors and offending. Critically, the hypothesized model also extends prior work to indicate that the pathways from risk to offending occur at different magnitudes for adjudicated male and female adolescents.

The hypothesized pathways were exploratory regarding expectations of gender differences in the effect of parental knowledge, community victimization, and maternal hostility on mechanisms of offending. Yet, the analyses revealed robust patterns: the mediation path from parent-adolescent relationships (parental knowledge and maternal hostility) to impulse control, substance use, and offending is stronger for females than males, supporting sub-hypothesis 3a. Likewise, the effect of parental knowledge on impulse control is stronger for females than males. In other words, parent-adolescent

relationships appear to be associated more strongly with adolescent female (vs. male) offending behavior through a specific partial mediation.

When females offend, according to the results from the current study, more maternal hostility and low parental knowledge of activities is associated with more engagement in impulsivity, substance use, and finally, offending behavior. This finding is not surprising if parenting matters more for these girls' behavior choices. Family violence is particularly salient, as it occurs within a relationship that is meant to be safe and secure (e.g., such as the mother-child relationship). Violence perpetrated by a family member, especially a parent, compromises emotional and physical security in youth. Earlier victimization (of any type) and more frequent victimization experiences are associated with more psychological distress and offending behavior (Ford, Chapman, Connor, & Cruise, 2012). Finally, social learning theory (Bandura, 1977) suggests that youth exposed to violence (e.g., in the home or community) learn to imitate violence and incorporate offending into their behaviors. Without modeling of appropriate impulse control and monitoring of behavior, it would be easier for youth to act impulsively. Acting upon impulses might include drinking at a party with peers or engaging in harder drugs like use of cocaine or methamphetamines and resulting offending behavior. This pathway appears to be especially salient for adjudicated female adolescents, compared to adjudicated male adolescents.

Several researchers highlight the strong effects of female adolescent relationships - and family relationships in particular- on adolescent behavioral outcomes (Covington & Surrey, 1997, DiClemente et al., 2001; Pettit et al., 2001; Roy et al., 2010; Wong et al.,

2013). For example, Paquett & Underwood (1999) suggest that interpersonal violence at home is related to youths' view of self more strongly for females than males. Perhaps females' emphasis on relationships allows them to draw more benefits from their parents' knowledge of their behaviors. It follows that they would also experience greater risk from their parents' lack of knowledge or hostility in the parent-adolescent relationship. Indeed, findings suggest that parental knowledge of behavior is associated with improved impulse control, reduced substance use, and consequent offending, more strongly for females than males. Similarly, parental hostility is related to poorer impulse control and more substance use and consequent offending. This effect is also stronger for females than males. Moreover, these findings support literature suggesting adjudicated adolescent females come from homes with higher maternal conflict than adjudicated males (Henggeler, Edwards, & Borduin, 1987), which contributes to female offending behavior. This is not to say that relationships are meaningless for male adolescents. Instead, aspects of relationships, such as parental knowledge and parental hostility, appear to impact females' pathway to offending more than males' pathway, through impulse control and substance use.

### **Gender Differences in Level of Exposure to Risk Factors**

In the current study, females offend less than males, possibly due to their lower exposure to victimization. This finding is similar to others. For example, in urban minority youth community victimization is higher (Griffin, Botvin, Scheier, Diaz, & Miller, 2000), and parental monitoring is lower (Svennson, 2003) for males than females. If males are exposed more to community victimization and, they are likely to be involved



in more risky situations. Males in the current sample reported more community victimization, and this victimization contributed to their higher levels of offending through an indirect pathway (*gender* → *victimization* → *offending*).

The pathway from gender to offending appears to be influenced by gender differences in maternal hostility. Indeed, the pathway from *female* → *more maternal hostility* → *less impulse control* → *more substance use* → *more offending* was significant. Thus, this finding is in concurrence with previous findings that females experience more interpersonal victimization in the context of close relationships, and also finds that the effects of this victimization are equally important for males and females, with the pathways linking maternal hostility to offending differing for males and females.

An alternate explanation for the statistical relationship between risk and mechanisms of offending is that adolescent impulse control actually predicts parenting practices, rather than the opposite. For example, adolescents with high impulse control may inspire trust from their parents, and consequently, parents feel less need to monitor their children and also have fewer hostile interactions with their children. While this explanation is possible, social control theory (Nagin & Paternoster, 1994), and the General Theory of Crime (Gottfredson & Hirschi, 1990) provide strong theoretical background to expect that parents play a prominent role in adolescent behavior (impulse control, substance use, and offending). These theories purport that youth develop psychosocial maturity by learning social norms from parents, and that parenting practices teach children how to manage impulses. Furthermore, in a longitudinal study, King, Fleming, Monahan, & Catalano (2011) reported that self-control from 6-8<sup>th</sup> grade predicts

substance use during grade eleven. These findings suggest the model has appropriate directionality, and at the very least, the relationship among these constructs is bi-directional.

Finally, one alternate explanation for gender differences in risk and protective factors for adolescent offending behavior is that females and males may experience entirely different risk factors for offending. For example, Thompson and Morris (2013) found that academic achievement predicted recidivism for males, but not for females. However, females and males both experience the *risk* → *offending* link with prominent risk factors such as victimization (Johansson & Kempf-Leonard, 2009), racial marginalization, and economic hardship (Steffensmeier & Haynie, 2000). Thus, this explanation as a standalone is unsatisfactory because entirely unique risk factors (e.g., academic achievement) do not substantially contribute to gender related variation in offending.

### **Strengths and Limitations**

The credibility of the current findings is bolstered by several features of this study. First, the sample consists of adolescent males and females who are adjudicated. Direct gender comparisons have rarely been done with high quality measures and sufficient power to detect meaningful relationships. The current study incorporated widely accepted measures of victimization (ETV; Selner-O'Hagan et al., 1998), maternal hostility (Conger et al., 1994), impulse control (Weinberger & Schwartz, 1990), and variety of offending (Hindelang, Hirschi & Weis, 1981; Thornberry & Krohn, 2000). Furthermore, the measure of parental knowledge was self-report, which is superior to

parental report- as parents often overestimate the amount of knowledge they have about their child's life. Of course, these findings must be considered under the auspices of social norms. Males tend to underreport victimization, particularly sexual victimization, when they perceive it as undermining masculinity (Pino & Meyer, 1999). However, collateral information collected from a subsample ( $n = 1137$ , 82% parents, 11% female relatives, 7% other), in the current study suggests the integrity of the model is maintained despite the self-report nature of the measures, as participant and collateral informant variables were adequately correlated for community victimization ( $r = .29, p < .01$ ), perceived parental knowledge ( $r = .31, p < .01$ ), impulse control ( $r = .17, p < .01$ ), and offending variety<sup>2</sup> ( $r = .30, p < .01$ ). Furthermore, the pattern of correlations among community victimization, parental knowledge, impulse control, and offending variety were in the same expected direction and strength for both the participants and collateral informants (see Appendix D for more information). These correlations lend confidence to the content validity of the self-report measures. Additionally, the combination of two data sources allowed for sample augmentation. Propensity score matching also allowed for the control of demographic variables that may impact gender differences in offending while retaining power.

Several limitations of the study are also important to note. First, this study is cross-sectional in design, limiting the ability to make any causal claims regarding the direction of effects in the hypothesized model. While findings support an initial

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<sup>2</sup> Offending variety for this subsample was calculated as the proportion of 24 items that the participant endorsed, or the collateral informant endorsed for the participant. This version of the measure is a more extensive measure than that included in Studies 1 and 2, due to constraints of combining two samples.

establishment of associations among gender differences in etiological factors of adolescent offending, future studies should incorporate longitudinal models in order to test the causal nature of these relationships. Second, there was not a sufficient sample size to include paternal hostility (i.e., many participants were missing paternal data), this variable may be important to include in future work. Similarly, romantic relationships and peer relationships have the potential to affect mechanisms (e.g., substance use) of the link between risk and offending and should be considered in a more comprehensive model. Third, this sample consisted entirely of adjudicated youth. Future studies could use this model to examine community samples in order to improve generalizability.

Fourth, sexual violence is a unique victimization experience that may be associated with specific experiences for males vs. females (i.e., gender-differentiated stigmatization and experienced more by females than males), and unique pathways to offending (i.e., associated with certain types of offending for males vs. females) (Basile & Saltzman, 2002; Fisher, Cullen, & Turner, 2000; Kerig et al., 2009; Miccio-Foneseca, 2008). Thus, it may warrant isolation in future studies in order to determine its nuanced effects on offending for both males and females. A challenge with this approach is sample size limitations, as the rate of female sexual offenders in the justice system is substantially smaller than that of males.

Fifth, and in a similar vein, offending behavior is measured as a variety of offending score, which tends to be more accurate than count scores. However, it cannot be disaggregated according to violent and non-violent offending in this sample, and unique victimization experiences may predict different types of offending for females

versus males. Thus, this study is limited in its' ability to specify which types of offending are primarily targeted by the examined risk factors. Notably, the General Theory of Crime would suggest that self-control predicts propensity of an individual to engage in *any* criminal act, rather than specific types of offending behavior. Using this theoretical background, it is possible that the association between interpersonal risk and offending as explained by impulse control and substance use hold different strengths for each gender regardless of offending type.

### **Implications**

While adjudicated males and females share certain needs, such as attention placed on family and community exposure to violence, they may benefit from targeted approaches. In particular, findings from the current study imply that future research should consider studying models for prevention and rehabilitation efforts for young females at risk on family relationships. In particular, research, policy, and practice should target mechanisms (impulse control and substance use) of offending as well as the offending behavior itself. Male prevention and treatment efforts may benefit from a focus on their exposure to community victimization. The association between family risk and mechanisms of offending for females indicates that family relationships may be an important construct to consider in future research and policy and practice decisions. Additionally, impulse control and substance use are particularly important mechanisms of the risk-offending link, as these psychological traits and behaviors are potentially modifiable characteristics. Improvement in impulse control and the reduction of substance use may be associated with lower recidivism long-term. Unfortunately, past

victimization experiences cannot be “undone,” but the associated mechanisms may be important targets for reduction of recidivism.

In conclusion, these findings indicate that different levels of interpersonal risk exposure and different pathways to offending may explain gender differences in rates of offending and adjudication. Ultimately, these differences have downstream behavioral consequences that explain gender differences in adolescent offending and adjudication. Results from the current study support the argument that parental knowledge and maternal hostility affect offending more strongly for females than males, and this pathway occurs through the impulse control and substance use. These findings have implications for future research; point a spotlight on the need to include gender-sensitive considerations in theories of offending; and ultimately may help focus the creation of gender-sensitive prevention and rehabilitation programs.

## **Chapter Twelve: General Discussion**

Despite the fact that overall rates of adolescent offending are higher for males than females, adolescent females are incarcerated with increasing frequency (Puzzanchera, Adams, & Hockenberry, 2012), resulting in urgent need for research in this field. The presented program of research, resulting in Studies 1 and 2, is among the first to directly examine gender differences in the etiology of offending behavior. Findings from the studies presented in this dissertation support gender-sensitive (Kerig et al., 2009), trauma-focused (Johansson & Kempf-Leonard, 2009), and self-control (Gottfriedson & Hirschi, 1990) explanations for the gender differences in offending behavior among adjudicated adolescents.

Findings from Study 1 indicate that females are both exposed to higher levels of maternal hostility and this hostility has a stronger association with anxiety and, in turn, offending for females than males. In contrast, males are experiencing more community victimization, which is similarly associated with subsequent offending for both males and females. Thus, the indirect path from maternal hostility to anxiety to offending describes etiology of offending that is more relevant for females than males; whereas gender differences in community victimization help explain gender differences in rates of offending. Study 2 complements these findings by demonstrating gender differences in

the role of impulsivity and substance use as mediators of the paths from interpersonal risk to offending. That is, compared to males, females have a stronger indirect association of parental knowledge with offending, due to stronger associations between impulse control and substance use. Again, males' higher exposure to community violence has similar consequences for males' and females' offending through impulse control and substance use. Thus, Study 2 shows that the indirect path from parental knowledge to offending describes etiology of offending that is more relevant for females than males; whereas gender differences in community victimization again help explain gender differences in rates of offending.

Taken together, findings from these studies suggest that family factors (particularly maternal hostility and parental knowledge) may be more salient for females' etiology of offending. Prior work on gender differences in relationship interest (Roy et al., 2000) support this finding. Thus, research, policy, and practice should continue to consider relationship quality in the design of studies and treatment programs. Males, on the other hand, may have higher rates of offending due to their higher exposure to community violence, which should also be considered as a factor in study and treatment program design. However, the importance of community violence for offending did not differ by gender; thus, it is not a path that is uniquely related to males' vs. females' offending.

Future research should test a comprehensive model that incorporates constructs from both studies in a longitudinal design, involving multiple informants. Even with the limitations of the presented studies, the findings have important implications for future



research on rehabilitation and prevention programs. Because all youth in the sample were adjudicated, findings have the strongest generalization towards other adjudicated youth and highlight the importance of gender-sensitive considerations. The effects of risk on mechanisms of offending are not the same for males and females. Anxiety, impulse control, and substance use are important, modifiable mechanisms of the association between risk and offending behavior. They are especially salient for female offenders. In conclusion, these studies support gender-sensitive theories of offending that suggest females' unique pathway from maternal hostility and parental to offending partially through anxiety symptoms and impulse control and substance use, while males' experience a more direct association between interpersonal risk and offending, with high levels of community victimization.

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## Appendix A

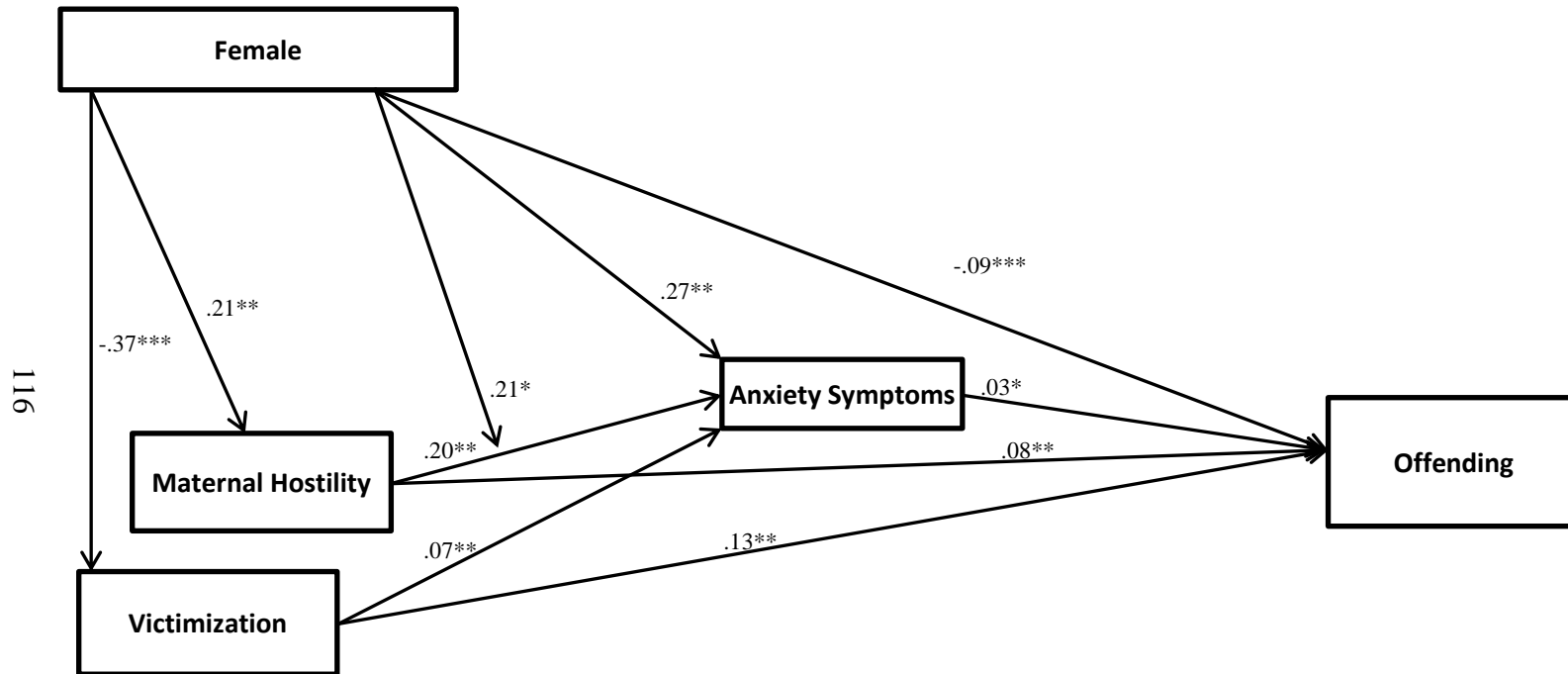


Figure A. Unstandardized regression coefficients for the tested model of anxiety symptoms as a mediator of the effect of gender and exposure to interpersonal violence on offending, Study 1.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

## Appendix B

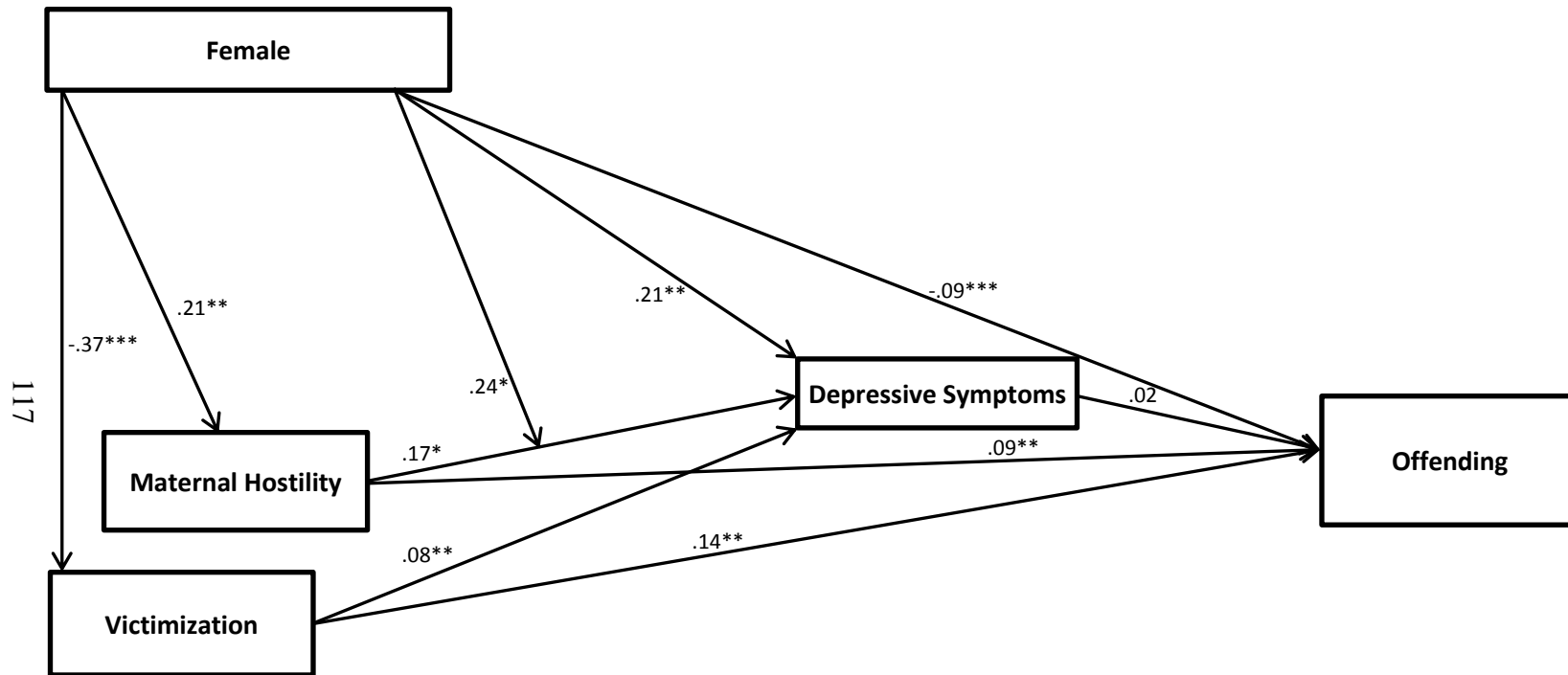


Figure B Unstandardized regression coefficients for the tested model of depressive symptoms as a mediator of the effect of gender and exposure to interpersonal violence on offending, Study 1.

\* $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$



# Appendix C

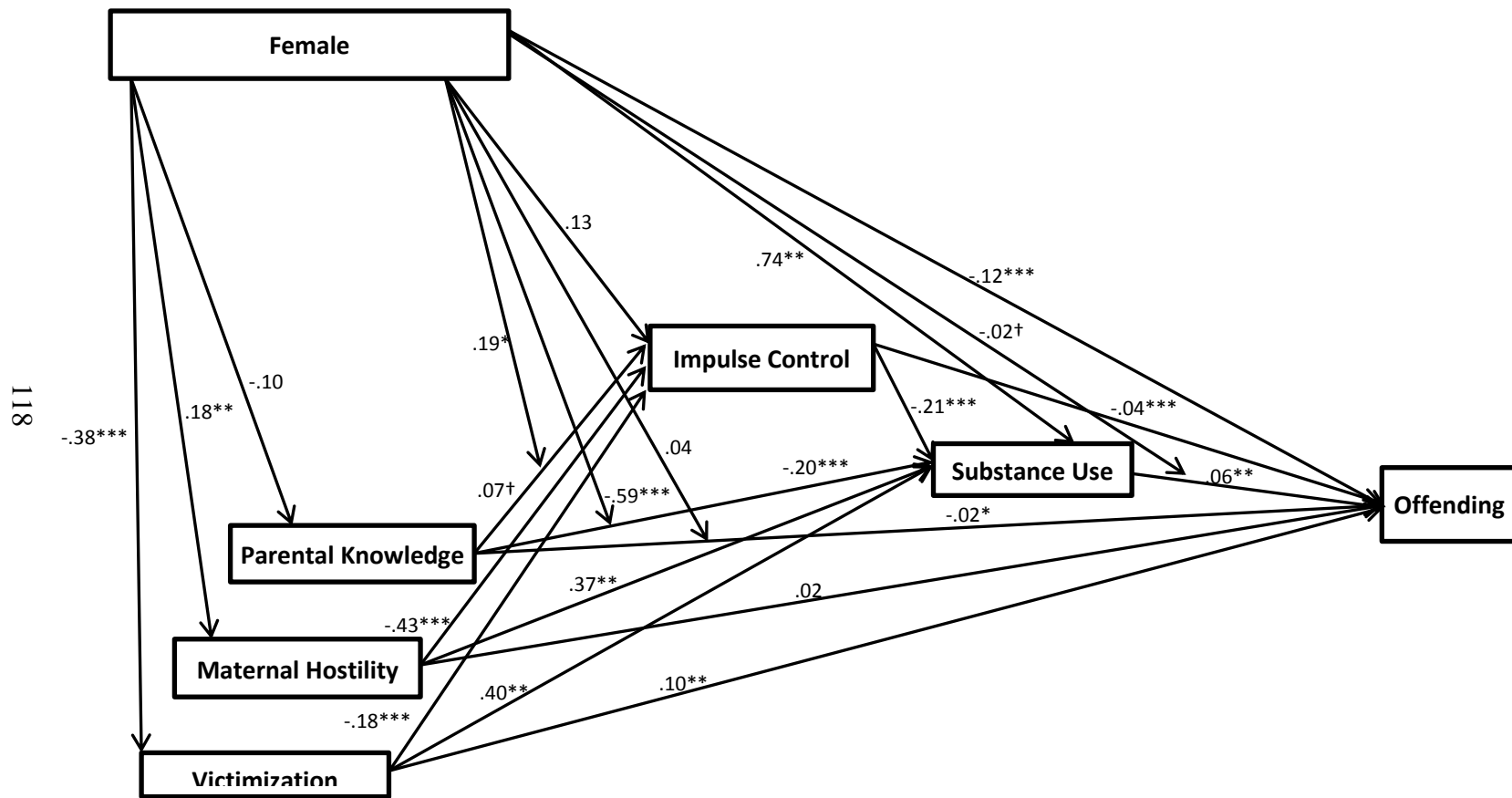


Figure C. Unstandardized regression coefficients for the tested model, Study 2.  
 $*p < .05$   $**p < .01$   $***p < .001$

### Appendix D

	Community Victimization	Parental Knowledge	Impulse Control	Offending Variety
Community Victimization	1	-.09**	-.20**	.29**
Parental Knowledge	-.25**	1	.22**	-.13**
Impulse Control	-.30**	.16**	1	-.22
Offending Variety	.39**	-.22**	-.24**	1

*Table D. Correlations among collateral respondents and participants.* The top right corner contains correlations for collateral respondents. The bottom left corner contains correlations for participants.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$